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THE LAUNDERING OF WOOL: EFFECT OF DETERGENTS AND WASHING METHODS ON FABRIC PROPERTIES

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INTRODUCTION

ALTHOUGH most clothing made of wool must be dry-cleaned, many knit wool garments and those made of lightweight flannels and challies may better be washed than dry-cleaned. To obtain information on the best conditions for such laundering as a basis for advising homemakers, the Bureau of Human Nutrition and Home Economics is studying the effectiveness of soaps and synthetic detergents under varying washing conditions (*2,3*). Reported here is a study of the changes that occur in certain properties of a lightweight wool fabric upon repeated laundering with alkaline and nonalkaline detergents, using washing methods in which agitation and temperature were varied.

EXPERIMENTAL PROCEDURE

THE DETERGENTS AND TEST FABRIC———The detergents selected for this study include an unbuilt and a built soap and two unbuilt and two built synthetic detergents. The unbuilt soap was an industrial chip soap. The other five detergents were household products purchased on the retail market. All had been analyzed in a previous study (3). For convenience certain results on the composition analyses are repeated in Table I.

Many launderings were done with only four of the detergents. The built soap and unbuilt synthetic detergent 2 were omitted, since exploratory work showed similar results produced by the unbuilt and built soaps, and by the two unbuilt synthetic detergents. Included in the study for comparison was a sulfonated oil, a wetting agent without detergent properties. Also included were an alkaline salt (tetrasodium pyrophosphate) and a neutral salt (sodium sulfate), because they are often used as builders in detergents.

The test fabric was a lightweight wool challis dyed light blue. It had been dyed with acid dyestuffs with 2 percent sulfuric acid and 10 percent Glauber's salt) to color measurements of "R_d", "a", and "b" of 36.3 percent, —3.8, and —9.4, respectively. The nurelaxed fabric weighed 3.5 ounces per square yard. Properties of the relaxed fabric were: 3.8 ounces per square yard, 62 warp yarns per inch, 37 ± 0.9 pounds warp breaking strength, 32 percent warp elongation, and 19.7 ± 0.3 percent indigo carmine absorption.

The test fabric was purchased at a department store and nothing is known of the history of the wool or of its manufacture into fabric. It had not been treated for shrinkage control. The fabric was labeled "washable" by the manufacturer and was suitable for infants' and children's clothing —garments that require frequent laundering.

PREPARATION OF SAMPLES———Samples of fabric, 9″ x 10″, were cut from the material, and in order to get them into relaxed condition, they were wet out in distilled water at 40°C and spread flat on plate glass with a roller weighing 1 kg. The roller was pulled in such a manner that little or no tension or pressure was exerted by the hand. The samples were allowed to air dry. For reference points in determining shrinkage, a 5-inch square was marked with a template near the center of each sample, with sides parallel to the warp and filling yarns, and threads were sewed into the fabric, on the marks, at two points on each side.

WASHING METHODS———Each fabric

TABLE I
COMPOSITION OF SOAPS AND SYNTHETIC DETERGENTS

Detergent[1]	*Active ingredient (Anhydrous soap or synthetic detergent)*	*Matter volatile at 105° C*	*Matter insoluble in water*	*Alkaline salts (as Na_2CO_3)*	*Neutral salts*	*Phosphate (as P_2O_5)*	*pH of 1 percent aqueous solution*
	%	%	%	%	%	%	
Unbuilt soap	92.5	2.3	2.0	2.7	0.4	0	9.9
Built soap	57.3	5.0	12.1	12.3	1.3	4.6	10.0
Unbuilt synthetic detergent 1	38.2	4.1	0	0.4	56.6	0	7.5
Unbuilt synthetic detergent 2	29.6	1.1	0	1.7	65.2	4.6	6.5
Built synthetic detergent 1	18.7	4.3	0.1	17.6	58.0	29.1	10.0
Built synthetic detergent 2	12.5	2.2	34.5[2]	15.4	27.6	21.9	9.9

[1] In previous study (3) these detergents were designated as soap 1, built soap 7r, sodium lauryl sulfate 3r, sulfated glyceryl ester 1r, sodium lauryl sulfate 5r, and polyglycyl ester 4r, respectively. All the detergents are anionic except the polyglycyl ester which is nonionic.
[2] Qualitative test indicated starch.

sample was washed separately in 200 ml of detergent solution with ten ¼-inch steel balls in a quart jar in the Launder-Ometer operated at 42 rpm for 30 minutes, rinsed twice in beakers and twice for 2 minutes each in the Launder-Ometer, then spread flat without tension on plate glass to air dry. Launderings were done at 40°C using 0.25 percent concentration of the product, as received, in both distilled water and water of 300 ppm hardness. For each set of washing conditions two replicates were used. In order to determine the accumulative effect of the detergent, samples were washed and dried ten times. Following the *final* laundering, each sample was washed in a 0.25 percent solution of sodium hexametaphosphate in distilled water in an attempt to remove the detergent from the fabric. The sample was then rinsed, rolled on plate glass, and dried as before.

Some samples of the wool challis were also laundered 10 times at 40°C, others at 60°C, and followed with a sodium hexametaphosphate wash in much the same manner as before, but subjected to mild agitation, ie, without steel balls, and to a shorter washing time, 10 minutes rather than 30. A few launderings with mild agitation at 40°C were also done using 0.15 and 0.35 percent concentrations of the detergents.

Still other wool samples were washed at both 40°C and 60°C with minimum agitation (soaking) for 30 minutes and rinsed by soaking 2 minutes each time in four changes of water.

For convenience in the discussion that follows, the five experimental washing methods employed are designated as:

a) Severe agitation, 30 minutes, 40°C (Launder-Ometer wash with steel balls.)
b) Mild agitation, 10 minutes, 40°C (Launder-Ometer wash).
c) Mild agitation, 10 minutes, 60°C (Launder-Ometer wash).
d) Minimum agitation, 30 minutes, 40°C (soak wash).
e) Minimum agitation, 30 minutes, 60°C (soak wash).

MEASURING THE EFFECT OF DETERGENTS AND WASHING METHODS ———The extent of modification of the fabric or damage caused by repeated laundering was indicated by shrinkage and by changes in breaking strength, elongation, color, and indigo carmine absorption.

Shrinkage—Shrinkage in the fabric was measured after the first, fifth, and tenth launderings and again after the sodium hexametaphosphate wash. Each sample was laid without tension on a flat surface with the cloth smooth and free from wrinkles. Then the distances marked off with threads in each direction of the fabric were measured with a steel rule. The average percent of shrinkage in both the warp and the filling directions was calclulated.

Breaking strength and elongation — Breaking strength by the raveled strip method (*1*) was determined on the unlaundered material and on samples after the final wash with sodium hexametaphosphate. All samples were conditioned at least 6 hours before testing in a laboratory maintained at 70°F and 65 percent relative humidity. Strength index values of the fabric were calculated by dividing the breaking strength by the number of yarns per inch. The elongation of the samples at the breaking load (*1*) was also measured and the percent of elongation calculated.

Color difference — Color measurements were made before laundering and after the first, fifth, and tenth launderings and after the sodium hexametaphosphate wash. The instrument used was a photoelectric color difference meter equipped to give three values for each color measured: "R_d" or light reflectance; "a" which measures redness when plus, gray at zero, greenness when minus; and "b" which measures yellowness when plus, gray at zero, blueness when minus.

Each sample was read on the three scales in the same two places before and after laundering. For the reading, the sample was backed by a porcelain enamel standard in order to minimize the effect of background on color. The average color difference in NBS units* between the relaxed unwashed material and the fabric laundered with the detergent was calculated from the color readings according to Hunter's formula (*6*).

* This unit of measurement, devised by Judd (*7*), was so adjusted as to make the color difference of one unit the maximum difference tolerable in the average commercial color match.

TABLE II

SHRINKAGE, BREAKING STRENGTH INDEX, AND ELONGATION (WARP DIRECTION) OF WOOL TEST FABRIC: EFFECT OF FOUR DETERGENTS, A WETTING AGENT, A NEUTRAL SALT, AND AN ALKALINE SALT ON FABRIC LAUNDERED 10 TIMES FOLLOWED BY A SODIUM HEXAMETAPHOSPHATE WASH, FIVE WASHING METHODS.

Detergent, wetting agent, and salt[1]	*Washing method*				
	Severe agitation, 30 minutes, 40° C	*Mild agitation, 10 minutes, at—*		*Minimum agitation, 30 minutes, at—*	
		40° C	*60° C*	*40° C*	*60° C*
	Shrinkage[2]				
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Unbuilt soap in distilled water	6.4	4.4	..	2.1	..
Unbuilt soap in 300 ppm water	6.8	3.5	3.5	2.1	1.9
Unbuilt synthetic detergent 1 in 300 ppm water	6.3	4.0	3.7	1.8	1.7
Built synthetic detergent 1 in 300 ppm water	8.0	5.1	4.4	2.1	3.0
Built synthetic detergent 2 in 300 ppm water	..	4.4	4.4	..	3.8
Sulfonated oil in distilled water	9.1	5.5	..	1.7	..
Sulfonated oil in 300 ppm water	11.1	5.4	5.7	2.0	1.5
Sodium sulfate in 300 ppm water	13.8	5.7	..	2.7	..
Tetrasodium pyrophosphate in 300 ppm water	8.0	4.7	..	2.9	..
Distilled water without detergent	12.5	4.7	5.4	2.0	2.4
300 ppm water without detergent	13.6	5.3	5.4	1.7	2.4
	Breaking strength index[3]				
	Pounds per yarn	*Pounds per yarn*	*Pounds per yarn*	*Pounds per yarn*	*Pounds per yarn*
Unbuilt soap in distilled water	0.57	0.57	...	0.58	...
Unbuilt soap in 300 ppm water	.54	.54	0.56	.57	0.53
Unbuilt synthetic detergent 1 in 300 ppm water	.56	.56	.57	.60	.58
Built synthetic detergent 1 in 300 ppm water	.53	.54	.52	.59	.57
Built synthetic detergent 2 in 300 ppm water	...	.54	.55	...	.56
Sulfonated oil in distilled water	.54	.56	...	.57	...
Sulfonated oil in 300 ppm water	.53	.53	.53	.56	.58
Sodium sulfate in 300 ppm water	.49	.55	...	.56	...
Tetrasodium pyrophosphate in 300 ppm water	.53	.54	...	.58	...
Distilled water without detergent	.54	.56	.56	.57	.55
300 ppm water without detergent	.54	.56	.57	.57	.55
	Elongation (at break)[4]				
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Unbuilt soap in distilled water	40	40	..	35	..
Unbuilt soap in 300 ppm water	41	38	35	34	35
Unbuilt synthetic detergent 1 in 300 ppm water	44	42	35	35	37
Built synthetic detergent 1 in 300 ppm water	43	40	38	36	34
Built synthetic detergent 2 in 300 ppm water	..	41	39	..	37
Sulfonated oil in distilled water	41	37	..	34	..
Sulfonated oil in 300 ppm water	44	39	38	34	30
Sodium sulfate in 300 ppm water	48	40	..	36	..
Tetrasodium pyrophosphate in 300 ppm water	45	41	..	37	..
Distilled water without detergent	47	42	39	33	34
300 ppm water without detergent	47	41	41	34	35

[1] Each sample was laundered in 0.25 percent solution of the product and rinsed, for a total of 10 launderings. Following the tenth laundering each sample was washed in 0.25 percent sodium hexametaphosphate solution in distilled water and rinsed in distilled water.
[2] Two measurements from each of two replicate samples were averaged and the percent shrinkage calculated. Differences of 0.7 percent and greater are significant.
[3] Five measurements from the two replicate samples were averaged and the breaking strength index calculated. Differences of 0.05 pounds per yarn and greater are significant. Breaking strength index for unlaundered wool test fabric is 0.60 pounds per yarn.
[4] Five measurements from the two replicate samples were averaged and the percent of elongation calculated. Differences of 4 percent and greater are significant. Elongation (at break) for unlaundered wool test fabric is 32 percent.

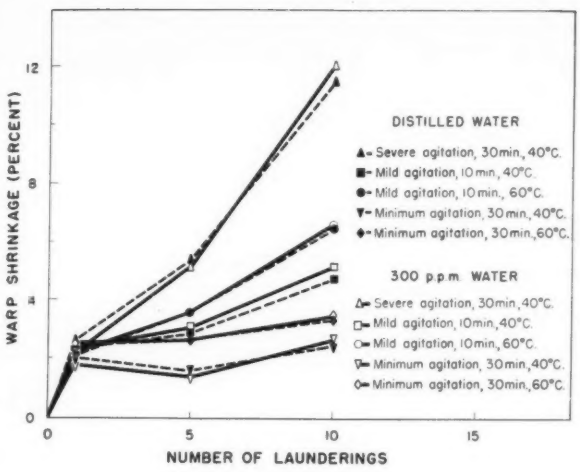
WARP SHRINKAGE (PERCENT)
NUMBER OF LAUNDERINGS
DISTILLED WATER
▲- Severe agitation, 30min., 40°C.
■- Mild agitation, 10 min., 40°C.
●- Mild agitation, 10 min., 60°C.
▼- Minimum agitation, 30 min., 40°C.
◆- Minimum agitation, 30min., 60°C.
300 p.p.m. WATER
Δ- Severe agitation, 30min., 40°C.
□- Mild agitation, 10min., 40°C.
○- Mild agitation, 10min., 60°C.
▽- Minimum agitation, 30min., 40°C.
◇- Minimum agitation, 30min., 60°C.

Figure 1

Warp shrinkage in wool test fabric: effect of five washing methods on fabric laundered 10 times in water without detergent.

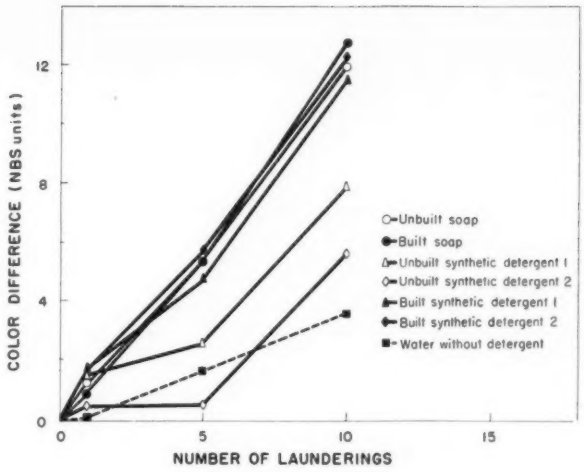
COLOR DIFFERENCE (NBS units)
NUMBER OF LAUNDERINGS
○- Unbuilt soap
●- Built soap
Δ- Unbuilt synthetic detergent 1
◇- Unbuilt synthetic detergent 2
▲- Built synthetic detergent 1
◆- Built synthetic detergent 2
■- Water without detergent

Figure 2

Color difference in wool test fabric: effect of six detergents (0.25 percent solutions in distilled water) on fabric laundered 10 times with mild agitation for 10 minutes at 40° C.

Indigo carmine absorption—Since certain types of modification in wool result in its increased affinity for dyes, the indigo carmine absorption test has been used by some workers (*4, 10, 11, 12*) for measuring the degree of change in wool when modified by excessive chemical treatment or by mechanical means. For the method to be applicable, the type of modification must involve a change in the dyeing properties of the wool. In this study, determinations were made of the amount of indigo carmine dye absorbed by samples laundered 10 times and subsequently treated with the sodium hexametaphosphate wash.

A commercial indigo carmine was used and a dye solution prepared containing 0.1 millimole of pure dye per 100 ml and 0.01 N with respect to sulfuric acid. The solution, made fresh daily, was standardized against 0.01 N potassium permanganate. A sample of fabric* weighing 1.00 gram was placed in 100 ml of dye solution, the material stirred until thoroughly wet out and allowed to stand in the solution for 2 hours,** with occasional stirring, to absorb the dye. Two aliquot parts (25 ml each) of the solution were then titrated with potassium permanganate as before and the percent of dye absorbed by the fabric calculated. The average of four such dye absorption determinations, two from each of the two washing replicates, was reported.

* Fabric conditioned and weighed at 70° F and 65 percent relative humidity.

** A few determinations were also made in which the laundered wool sample was allowed to stand in the dye solution for 20 hours. Although the longer time resulted in greater dye absorption, there was less differentiation between samples in the 20-hour test than in the 2-hour test.

CHANGES IN FABRIC PROPERTIES

Wetting out the fabric samples with water in preparing them for laundering relaxed the material and caused slight shrinkage and increase in weight. All comparisons of the effect of detergents, wetting agent, and salts on the various properties of the test fabric are reported in terms of the wet out or relaxed material. In instances of repeat tests (washing with mild agitation at 40°C), the results are in agreement. On repeated laundering, the wool shrank about as much in the warp direction as in the filling. For simplicity in presentation, shrinkage, breaking strength, and elongation in only the warp direction of the fabric will be discussed.

Under the conditions of this study the results for shrinkage, breaking strength, and elongation showed that, so far as these three properties are concerned, agitation of the sample was more important than temperature of the wash in producing change in the test fabric. For convenience in interpreting results, therefore, data for shrinkage, breaking strength, and elongation are presented together. Similarly, data for color difference and indigo carmine absorption are reported in one table. These latter results, in contrast to those for shrinkage, breaking strength, and elongation, indicated that with the alkaline detergents especially, temperature had a greater effect than agitation upon change in color and indigo carmine absorption by the laundered test fabric.

The relation between pH of the washing solution and the effect on fabric properties was apparent mainly in the results for color difference and indigo carmine absorption. Therefore, to point out the effect of alkaline and nonalkaline detergents upon the properties of the laundered wool test fabric, the products in the text tables for color difference and indigo carmine absorption are arranged in decreasing order of the initial pH of the solution in which the wool samples were washed.

SHRINKAGE———Shrinkage in the test fabric increased considerably as the number of washes increased. In general, the sodium hexametaphosphate wash following the tenth laundering caused little additional change. Shrinkage values for samples of the test fabric washed in water without detergent (mild agitation, 10 minutes, 40°C) are shown below. Differences in the data of 0.7 percent and greater are significant.

Number of launderings in water without detergent:	*Percent warp shrinkage in laundered wool fabric*	
	Distilled water	*300 ppm water*
1	2.3	2.3
5	2.9	3.1
10	4.8	5.2
Sodium hexametaphosphate wash	4.7	5.3

Table II gives the warp shrinkage in the wool test fabric laundered 10 times by the five different washing procedures with the various detergents, wetting agent, neutral and alkaline salts, and followed with the sodium hexametaphosphate wash.

As was expected, the results indicated that shrinkage in the wool test fabric and agitation of the material during laundering are directly related. That is, the washing method producing the greatest agitation of the sample caused the most shrinkage, those with mild agitation resulted in less shrinkage, and the soak procedures with minimum agitation caused the least shrinkage in the fabric. However, in both the mild agitation and the soak procedures,

temperature generally had little effect on shrinkage. Samples of the fabric washed by these methods in water without detergent shrank only slightly more at 60° than at 40°C (Fig 1). For samples washed in detergent solutions this difference was not observed.

Shrinkage values for test fabric laundered ten times with the detergents and followed with the sodium hexametaphosphate wash are given below for the three washing procedures at 40°C.

Detergent (0.25 percent solution):	*Percent warp shrinkage in wool fabric washed with—*		
	Severe agitation	*Mild agitation*	*Minimum agitation*
Unbuilt soap in distilled water	6.4	4.4	2.1
Unbuilt soap in 300 ppm water	6.8	3.5	2.1
Unbuilt synthetic detergent 1 in 300 ppm water	6.3	4.0	1.8
Built synthetic detergent 1 in 300 ppm water	8.0	5.1	2.1
Built synthetic detergent 2 in 300 ppm water	..	4.4	..

Differentiation among the various detergents, wetting agent, and salts on repeated laundering, was observed upon shrinkage mainly in the procedure involving severe agitation. But the shrinkage in the wool test fabric was considerably less when washed in water with detergents than when washed in water without detergent. Results shown below and arranged in decreasing order of shrinkage are for samples laundered 10 times with 0.25 percent solutions of the product (severe agitation, 30 minutes, 40°C) and followed with the sodium hexametaphosphate wash.

Detergent, wetting agent, and salt:	*Percent warp shrinkage in laundered wool fabric*
Sodium sulfate in 300 ppm water	13.8
300 ppm water without detergent	13.6
Distilled water without detergent	12.5
Sulfonated oil in 300 ppm water	11.1
Sulfonated oil in distilled water	9.1
Tetrasodium pyrophosphate in 300 ppm water	8.0
Built synthetic detergent 1 in 300 ppm water	8.0
Unbuilt soap in 300 ppm water	6.8
Unbuilt soap in distilled water	6.4
Unbuilt synthetic detergent 1 in 300 ppm water	6.3

Shrinkage was greatest in samples washed in water without detergent or in water with the neutral salt. The sulfonated oil may have had some lubricating effect on the fabric since shrinkage was decreased somewhat by this agent. Shrinkage was lessened somewhat by the built synthetic and the alkaline salt. The least shrinkage occurred with the soap and with the unbuilt synthetic detergent.

BREAKING STRENGTH———With repeated laundering the test fabric tended to lose strength. Also, it became less uniform in strength; variation increased from 2.4 to 7.7 percent.

Differences in strength (Table II) due to the various washing procedures and the detergents were small. As with shrinkage, change in strength of the test fabric on repeated laundering seemed related to the amount of agitation during laundering. For the most part, the washing procedure of greatest agitation resulted in the greatest loss in strength of the test material, that with mild agitation produced less change, and the soak procedure with minimum agitation caused little loss in strength. The increase in number of yarns per inch of fabric due to shrinkage from laundering also was related to the amount of agitation. For samples of the test fabric washed with the various detergents with severe agitation at 40°C, the number ranged from 65 to 69 yarns per inch; for those washed with minimum agitation at the same temperature, the number varied from 62 to 64 yarns per inch.

Loss in strength of the wool test fabric tended to be slightly greater when samples were laundered at 60° than at 40°C and greater with the built detergents than with the unbuilt. Warp strength index values for the wool fabric washed 10 times with the detergents and followed with the sodium hexametaphosphate wash by the three procedures at 40°C are given below. The unlaundered test fabric had a strength of 0.60 pounds per yarn. Differences of 0.05 pounds per yarn and greater are significant.

Detergent (0.25 percent solution):	*Warp breaking strength index, in pounds per yarn, of wool fabric washed with—*		
	Severe agitation	*Mild agitation*	*Minimum agitation*
Unbuilt soap in distilled water	0.57	0.57	0.58
Unbuilt soap in 300 ppm water	.54	.54	.57
Unbuilt synthetic detergent 1 in 300 ppm water	.56	.56	.60
Built synthetic detergent 1 in 300 ppm water	.53	.54	.59
Built synthetic detergent 2 in 300 ppm water	...	.54	...

ELONGATION———The percent of warp elongation at the breaking load in the test fabric laundered 10 times by the five different washing procedures is also given in table II. With laundering, elongation increased considerably over the value of 32 percent for the unlaundered fabric. Differences of 4 percent and greater are significant

The results indicated that so far as change in elongation of the test fabric is concerned, agitation of the material during laundering was a more important factor than temperature of the wash. In this respect they agreed with results for shrinkage and breaking strength. Elongation values for the wool fabric washed 10 times with the detergents and followed with the sodium hexametaphosphate wash by the three washing procedures at 40°C were as follows:

Detergent (0.25 percent solution):	*Percent warp elongation of wool fabric washed with—*		
	Severe agitation	*Mild agitation*	*Minimum agitation*
Unbuilt soap in distilled water	40	40	35
Unbuilt soap in 300 ppm water	41	38	34
Unbuilt synthetic detergent 1 in 300 ppm water	44	42	35
Built synthetic detergent 1 in 300 ppm water	43	40	36
Built synthetic detergent 2 in 300 ppm water	..	41	..

With the procedure involving greater agitation the increase in elongation was greatest in samples washed in water without detergent and with the neutral and alkaline salts and least in samples washed with unbuilt soap (Table II). In the other washing procedures differences in percent of elongation between products were not pronounced.

COLOR DIFFERENCE———The extent of color change in the wool test fabric produced by agitation, temperature, and alkali in the detergent on repeated laundering are reported in Table III. Color differences in this fabric resulted from increasing light reflectance, decreasing red-greenness, and increasing yellow-blueness of the test samples. The data were not analyzed statistically. However, in this study workers were able to distinguish visually between fabric samples having a difference of only one NBS unit.* Therefore, color differences of that magnitude and greater are considered significant. As was expected, color change in the samples increased with increasing number of launderings (Figure 2). In many instances the change was greater with the higher concentration of detergent solution and greater in samples washed in distilled than in hard water solutions.

As shown below, pH measurements of the washing solutions and color difference results for samples washed with mild agitation for 10 minutes at 40°C, expressed in NBS units, indicated that for this dyed wool test fabric the alkalinity of the washing solution and color change on laundering are, with two exceptions, directly related. After laundering, measurements of the alkaline solutions showed a decrease in pH, indicating that the wool absorbed alkali on laundering. Results were as follows:

* This unit of measurement, devised by Judd (7), was so adjusted as to make the color difference of one unit the maximum difference tolerable in the average commercial color match.

COLOR DIFFERENCE (NBS units)
NUMBER OF LAUNDERINGS
Severe agitation, 30min., 40°C.
Mild agitation, 10 min., 40°C.
Mild agitation, 10 min., 60°C.
Minimum agitation, 30 min., 40°C.
Minimum agitation, 30min., 60°C.

Figure 3
Color difference in wool test fabric: effect of unbuilt synthetic detergent 1 (0.25 percent solutions in 300 ppm water) on fabric laundered 10 times, five washing methods.

Detergent, wetting agent and salt (0.25 percent concentration):	*pH of washing solution*		*Color difference in laundered wool fabric*
	Before laundering	*After laundering*	
Built synthetic detergent 2 in 300 ppm water	10.3	..	11.5
Unbuilt soap in distilled water	10.3	9.4	11.3
Tetrasodium pyrophosphate in 300 ppm water	9.8	..	9.3
Unbuilt soap in 300 ppm water	9.8	8.0	9.3
Built synthetic detergent 1 in 300 ppm water	9.7	7.8	7.2
Unbuilt synthetic detergent 1 in 300 ppm water	7.4	6.5	5.3
Sulfonated oil in distilled water	6.8	..	6.1
Sulfonated oil in 300 ppm water	6.4	..	6.2
Sodium sulfate in 300 ppm water	6.4	..	4.4
Distilled water without detergent	6.1	7.1	3.9
300 ppm water without detergent	5.8	6.0	3.7

With the test fabric used, temperature of the wash caused greater change in color than agitation. Color change was considerably greater at 60° than at 40°C. However, at both temperatures, increased agitation during laundering caused increased color change in the test material (Figure 3). Shown below are color difference values, in NBS units, for the test fabric laundered 10 times with the detergents and followed with the sodium hexametaphosphate wash by the procedures of mild agitation:

Detergent (0.25 percent solution):	*Color difference in wool fabric washed with mild agitation at—* 40° C	60° C
Built synthetic detergent 2 in 300 ppm water	11.5	15.9
Unbuilt soap in distilled water	11.3	...
Unbuilt soap in 300 ppm water	9.3	15.0
Built synthetic detergent 1 in 300 ppm water	7.2	15.0
Unbuilt synthetic detergent 1 in 300 ppm water	5.3	12.8

Of the various products (detergents, wetting agent, neutral and alkaline salts), the built synthetic detergents and the soap caused the greatest color change on repeated laundering, and samples of the test fabric washed with them at the higher temperature lost all the blueness of the original dyed color. At the lower temperature less fading occurred with built synthetic detergent 1.

At both temperatures unbuilt synthetic detergent 1 caused the least color change. However, at 60°C samples washed with this product changed considerably more than those in water without detergent; at 40°C these corresponding color values were similar.

Results with the alkaline salt (tetrasodium pyrophosphate) were much the same as with the soap and the built synthetics. The sulfonated oil wetting agent had about the same effect as unbuilt synthetic detergent 1. The neutral salt (sodium sulfate) had no more effect on color change than water without detergent.

INDIGO CARMINE ABSORPTION—— Measurements of indigo carmine absorption on the wool test fabric laundered 10 times with the various products and followed with the sodium hexametaphosphate wash are given in Table III. The results give quantitative data regarding the extent to which the fabric was modified when laundered with different amounts of agitation, different temperatures, and with alkaline and nonalkaline detergents. Dye absorption values of 2.0 percent and greater are significant.

Although the indigo carmine absorption test has not previously been used for detecting the degree of modification in wool due to laundering, the data presented here, in spite of some variability, indicate that

TABLE III
COLOR DIFFERENCE AND INDIGO CARMINE ABSORPTION BY WOOL TEST FABRIC: EFFECT OF FOUR DETERGENTS, A WETTING AGENT, A NEUTRAL SALT, AND AN ALKALINE SALT ON FABRIC LAUNDERED 10 TIMES FOLLOWED BY A SODIUM HEXAMETAPHOSPHATE WASH, FIVE WASHING METHODS.

	Washing method				
Detergent, wetting agent, and salt[1]	*Severe agitation, 30 minutes* 40° C	*Mild agitation, 10 minutes, at—* 40° C	60° C	*Minimum agitation, 30 minutes, at—* 40° C	60° C
	Color difference[2]				
	NBS unit	*NBS unit*	*NBS unit*	*NBS unit*	*NBS unit*
Unbuilt soap in distilled water	11.6	11.3	...	10.5	...
Unbuilt soap in 300 ppm water	9.9	9.3	15.0	6.2	14.7
Unbuilt synthetic detergent 1 in 300 ppm water	5.7	5.3	12.8	3.5	10.9
Built synthetic detergent 1 in 300 ppm water	7.9	7.2	15.0	4.7	14.7
Built synthetic detergent 2 in 300 ppm water	...	11.5	15.9	...	15.7
Sulfonated oil in distilled water	7.6	6.1	...	4.2	...
Sulfonated oil in 300 ppm water	7.6	6.2	11.0	4.3	8.1
Sodium sulfate in 300 ppm water	5.6	4.4	...	3.9	...
Tetrasodium pyrophosphate in 300 ppm water	10.3	9.3	...	8.1	...
Distilled water without detergent	5.2	3.9	6.3	2.9	4.3
300 ppm water without detergent	4.9	3.7	6.1	2.6	3.7
	Indigo carmine absorption[3] *and standard deviation*				
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Unbuilt soap in distilled water	27.7±4.2	22.2±1.2	.....	20.1±3.1	.....
Unbuilt soap in 300 ppm water	14.5±3.8	9.5±0.9	15.1±2.0	8.3±2.0	14.3±2.3
Unbuilt synthetic detergent 1 in 300 ppm water	12.0±3.0	6.9±1.6	14.2±0.2	5.7±1.5	10.0±2.5
Built synthetic detergent 1 in 300 ppm water	21.9±1.2	18.5±2.3	20.1±1.4	21.2±6.0	28.2±4.2
Built synthetic detergent 2 in 300 ppm water	.....	24.1±2.0	39.8±1.3	.....	51.0±5.2
Sulfonated oil in distilled water	15.6±0.3	10.9±0.2	.....	12.3±2.4	.....
Sodium sulfate in 300 ppm water	20.2±0.4	12.6±0.1	.....	18.8±0.4	.....
Tetrasodium pyrophosphate in 300 ppm water	29.1±2.2	22.9±2.3	.....	27.8±4.7	.....
Distilled water without detergent	20.3±3.9	18.5±2.3	16.0±1.3	16.0±1.0	17.1±1.4
300 ppm water without detergent	17.2±2.9	13.0±2.0	19.1±2.9	14.6±2.0	15.2±0.7

[1] Each sample was laundered in 0.25 percent solution of the product and rinsed, for a total of 10 launderings. Following the tenth laundering each sample was washed in 0.25 percent sodium hexametaphosphate solution in distilled water and rinsed in distilled water.

[2] Color measurements of "R_d", "a", and "b" for the unlaundered wool test fabric are: 36.3 percent, —3.8, and —9.4. Color difference values of one NBS unit and greater are considered significant.

[3] Each value is the average of 4 dye absorption determinations, 2 from each of the two washing replicates. Differences in dye absorption of 2.0 percent and greater are significant. Dye absorption by unlaundered wool test fabric is 19.7±0.3 percent.

the method may be of value for detecting change in wool caused by alkaline products. Experimental results recently reported by Rzegocinski and Lund (*10*) give supporting evidence. No doubt further work on the method is needed in order to increase precision. Results must be interpreted with due regard to any resist effects that might be produced in the laundering.

Solutions of the detergents, it will be noted, ranged in pH from the alkaline 10.3 for built synthetic detergent 2 to the practically neutral 7.4 for unbuilt synthetic detergent 1. Indigo carmine results for samples washed with these products, except soap in hard water, were higher for the alkaline products than for the non-alkaline. With soap in hard water much of the soap was used up in overcoming the hardness of the water. A probable explanation, therefore, for the relatively low absorption value with soap in hard water is that soap curds adhering to the wool were not completely removed by the sodium hexametaphosphate wash and thus produced a resist effect and prevented absorption by the test dye.

Measurements of pH of the washing solutions and indigo carmine absorption values for wool laundered ten times by the two procedures of mild agitation at 40° and at 60°C for 10 minutes with the four detergents and followed with the sodium hexametaphosphate wash are as follows:

Detergent (0.25 percent solution):	*pH of washing solution*	*Percent indigo carmine absorption by wool fabric washed at—*	
		40° C	*60° C*
Built synthetic detergent 2 in 300 ppm water	10.3	24.1	39.8
Unbuilt soap in distilled water	10.3	22.2	...
Unbuilt soap in 300 ppm water	9.8	9.5	15.1
Built synthetic detergent 1 in 300 ppm water	9.7	18.5	20.1
Unbuilt synthetic detergent 1 in 300 ppm water	7.4	6.9	14.2

Many investigators (*5, 8, 9*) have shown that wool preferentially *adsorbs* detergents over a wide range of pH—a fact which may help to explain differences in susceptibility of the laundered fabric to absorb the indigo carmine dye. After each wash with detergent, in order to remove as much detergent as possible from the fabric, all samples were well rinsed in four changes of water, then following the tenth laundering they were washed with sodium hexametaphosphate and again rinsed four times. Nevertheless, the low dye absorption value for unbuilt synthetic detergent 1 may be because it was adsorbed by the wool and thus somewhat decreased the affinity of the fabric for the indigo carmine dye.

Considerably higher than the value for unbuilt synthetic detergent 1 were the dye absorption results (Table III) for samples of the test fabric washed with the wetting agent, neutral salt and water without detergent (solutions ranging in pH from 6.8 to 5.8). About the same dye absorption was obtained for these products as for the unlaundered material.

The indigo carmine results showed that with the alkaline detergents especially, temperature had a greater effect than agitation on dye absorption. However, in many cases for both 60° and 40°C, the soak wash (minimum agitation) for 30 minutes caused greater dye absorption than the mild agitation for 10 minutes. This fact is shown in the following results for two of the alkaline detergents at 60°C:

Detergent (0.25 percent solution in 300 ppm water):	*Percent indigo carmine absorption by wool fabric washed with—*	
	Mild agitation, 10 minutes	*Minimum agitation, 30 minutes*
Built synthetic detergent 2	39.8	51.0
Built synthetic detergent 1	20.1	28.2

At 40°C some of the values for the 30-minute soak approached those for the 30-minute severe agitation method as indicated below:

Product (0.25 percent solution in 300 ppm water):	*Percent indigo carmine absorption by wool fabric washed with—*	
	Severe agitation	*Minimum agitation*
Tetrasodium pyrophosphate	29.1	27.8
Built synthetic detergent 1	21.9	21.2

It would seem, therefore, that time is an important factor in the laundering of wool and a long soak may be more injurious to wool than a short mild agitation specially if an alkaline detergent is used. Of the conditions investigated, the washing method with mild agitation for 10 minutes at 40°C resulted, for the most part, in the least dye absorption by the test fabric. No doubt absorption would have been even less, that is the fabric would have been less modified, had a soak wash at 40°C for only 10 minutes been used.

Of the various products that were evaluated by the different laundering methods the wool samples washed with the built synthetic detergents, soap in distilled water, and the alkaline salt (tetrasodium pyrophosphate) absorbed the most dye. Next in order were samples washed in water without detergent and with the neutral salt (sodium sulfate). Dye absorption was somewhat less in samples washed with the wetting agent and with soap in hard water. Samples washed with unbuilt synthetic detergent 1 absorbed the least amount of dye of any of the detergents tested.

SUMMARY

This study determined the effect of repeated laundering under varying washing conditions using different detergents on shrinkage, breaking strength, elongation, color difference, and indigo carmine absorption in a lightweight wool test fabric. The six detergents selected for the study included both alkaline and non-alkaline products. The fabric was laundered by five washing methods in which agitation and temperature were varied.

Under the conditions of this study, changes in the test material for shrinkage, breaking strength, and elongation were related to agitation of the fabric during laundering, and agitation was a more important factor than temperature of the wash in producing the changes. Only in the procedure involving severe agitation were differences among the various detergents in shrinkage observed; the built synthetics caused greater shrinkage than the unbuilt synthetics or the soaps. With laundering, the test fabric tended to lose strength and to increase in elongation. However, differences in these two properties caused by the detergents were small.

For the wool test fabric and washing conditions used, temperature of the wash had a greater effect on color difference and indigo carmine absorption than had agitation of the fabric. Of the various detergents evaluated, the alkaline products—soaps and built synthetic detergents—caused considerable color change on repeated laundering. The unbuilt synthetic detergents, which are nonalkaline or practically neutral in solution, caused little color change. Dye absorption values, besides indicating the extent of modification caused by alkaline detergents, showed that long soak washes may be more injurious to wool than short washing methods involving mild agitation.

ACKNOWLEDGMENT

Grateful acknowledgment is given to Phyllis Putman for assisting with washing tests and calculation of results.

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• PATENT DIGEST •

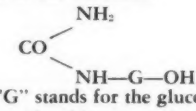
PAUL WENGRAF

CREASEPROOFING—— Glucose Ureides Plus Formaldehyde G, 2, 04

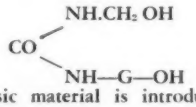
U S Pat 2,596,258
(Meijer——May 13, 1952)

Cellulosic materials are generally made creaseproof by preparing the fibers with resin forming components and thereupon heating to effect polymerization and combination of the resin with the fibers.

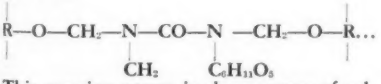
The present invention suggests as a resin-forming material the condensate of formaldehyde with the reaction product from aldoses or ketoses with a nitrogenous compound, preferably urea or a substituted urea. The reaction product is glucose ureide, ie, urea condensed with glucose to a product of the formula:



wherein "G" stands for the glucosyl radicle. Glucose ureide adds one equivalent formaldehyde mol, forming methylolglucose ureide:



If cellulosic material is introduced at a pH of 2 into the solution of the latter compound, methyl-glucose-ureide bridges are formed between two cellulosic chains by the reaction of formaldehyde with cellulose, it is stated. The schematic arrangement is given as



This reaction occurs in the presence of cellulose only; in the absence of cellulose no polycondensation of the methylol-glucose-ureide takes place.

Example: Glucose ureide is dissolved in 40% formaldehyde; some Carbowax 1500 is added as an auxiliary agent; after dilution, ammonium chloride is dissolved in this liquid. A fabric impregnated with this prepare and squeezed to a pick-up of 100% is dried at 90° C (pH=2). A shrink- and creaseproof fabric results after rinsing.

References cited by the Patent Office:

U S Pat 2,145,695 (Mattiotto/1939): preparing resins (water soluble at pH 7.6-8) from glucose ureide and formaldehyde; softness and resistance to crumpling are reported.

U S Pat 2,161,808 (Celanese Corp/1939): creaseproofing textiles by impregnating with hydroxylamine, hydrazine or derivatives thereof plus formaldehyde; the components are optionally applied in succession.

U S Pat 2,203,492 (Imperial Chemical Industries/1940): improving the fastness of direct dyeings of cellulosic fibers by soaking first with ureido ethyl pyridinium chloride (or similar compounds) and formaldehyde, then drying at about 100° C.

Brit P 209,697 (Stokes/1924): producing resins by condensing polyoses with urea and formaldehyde.

Brit P 450,620 (Brit Celanese/1936): creaseproofing textiles by impregnating with an aldehyde in the presence of fatty alcohols, fatty acids and esters thereof under acid conditions.

Brit P 480,958 (Pagani & Co/1938): a parallel to U S Pat 2,145,695 (above), according to the application date.

French P 813,990 (Zundel, Joliet & Co/1937): obtaining soft creaseproof finishes by preparing with sugar containing amino-aldehyde condensates, which permit curing at low temperatures (70-90° C).

FLAMEPROOFING—— Afterglow Avoided by Using Polyphosphoryl Amides G, 2, 03

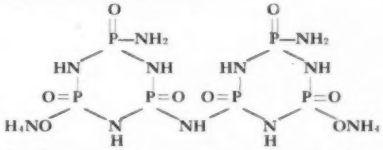
U S Pat 2,596,935——939
(Monsanto Chem Co——Nielsen et al——May 13, 1952)

This series of patents refers to the use of reaction products of phosphorus oxychloride and ammonia as obtained under special controlled conditions in two separate steps:

1) passing ammonia gas through a solution of phosphorus oxychloride in an inert solvent, eg, a hydrocarbon boiling above 100° C and preferably above 200° C, until at least 5 mols ammonia have combined with one mol $POCl_3$. The temperature has to be kept between 20 and 100° C in this case;

2) heating the suspension of the phosphorylamide at 155-250° C.

A small amount of ammonia is liberated in step (2) and apparently polymerization to a polyphosphoryl amide occurs. This is an insoluble and infusible product which may have the formula:



Synthesis of this product is described in U S Pat 2,596,935 while subsequent specifications U S Pat 2,596,936-939 refer to the application of these products as afterglow preventing agents as follows:

2,596,936 advocates application of a suspension of the polyphosphorylamides with a resorcinol- (or generally a phenol-) formaldehyde condensate. Replacing this resin condensate by urea-, melamine- or dicyanodiamide aldehyde condensate is proposed in 2,596,937. Resin components may be an alkyd resin combined with an amino-resin, according to U S Pat 2,596,-938, or an amino- or amido-aldehyde resin plus a plasticizer as described in U S Pat 2,596,939.

Although the polyphosphorylamide (applied, for example, as a coating substance) is insoluble and infusible, it has been observed that, at the high temperature generated in a flame, this polymer reacts with a resinous base to develop a nonburning gas. This swells the coating film to form a porous insulating layer, a phenomenon generally termed "intumescence."

The purpose of these inventions may be summarized as the attainment of glow-proofing rather than flameproofing effects. Metallic oxides, such as antimony trioxide, when combined with chloroparaffins seem to catalyze the afterglow, defined here as a "catalytic incandescent oxidation of carbon," even after removal of the igniting flame (cf U S Pat 2,596,936). In contrast, the compositions described in the current patents were found to reduce the afterglow substantially.

Among other references cited by the Patent Office:

U S Pat 2,122,122 (Victor Chem Works/1938): a nitrogen-phosphorus complex, obtained from P_2O_5 and ammonia by heating to at least 150° C is recommended herein for water softening.

U S Pat 2,052,886 (Brick Trust Ltd/1936): obtaining impervious and flameproof fibrous materials by first impregnating (in two steps) with zinc stearate, then with a flameproofing solution containing borates, tungstates and phosphates plus reaction products of ammonia and phosphorus oxychloride, and finally coating with a layer of gelatin that has been hardened with formaldehyde.

U S Pat 2,163,085 (Du Pont/1939): using the reaction product of phosphorus pentoxide and anhydrous ammonia for flameproofing cellulosic material.

U S Pat 2,413,163 (Du Pont/1946): a flameproofing composition of metallic oxides and chlorinated paraffins mixed with an alkaline, water soluble formaldehyde-ammonia-protein condensate to prevent tendering (cf *Am Dyesstuff Reptr 36,* 338 (1947)).

U S Pat 2,464,342 (Pollak & Fasal/1949): flameproofing textiles by impregnating with amonium pyrophosphate and melamine-formaldehyde precondensate, thereby obtaining a water-insoluble melamine-pyrophosphate in the fiber (cf *Am Dyestuff Reptr 38,* 478 (1949)).

U S Pat 2,197,357 (Ciba Products Corp/1940): using melamine-formaldehyde condensates as binding agents for other substances such as filling, finishing agents, etc.

PRINTING VAT DYES——Thickened with Oil-in-Water Emulsions D, 2, 01

U S Pat 2,597,281
(American Cyanamid——Borstelmann, Fordemwalt ——May 20, 1952)

Vat printing pastes usually contain starch blended with British gum, tragacanth or the like as thickeners. The current invention suggests the substitution of an emulsion of the oil-in-water type in place of these carriers, which have several drawbacks known to colorists. It was surprising to note that these emulsions are stable despite their relatively high content on electrolytes, ie, sodium- or potassium carbonate and Rongalite. Neutralized (alkali-, Ca-, Mg-, Cr-) lignin sulfonates are preferred as dispersing agents. The outer aqueous phase may contain, in addition to the electrolytes, appropriate surface-active agents. A water-insoluble, nonsaponifiable oil, preferably a more fluid petroleum fraction of boiling range 300-400° C, forms the oily phase (from 15-60% of the emulsion) and serves primarily to body the emulsion. It is homogenized with the outer phase. The color may be added while the emulsion is formed.

Example: 540 p of an aliphatic hydrocarbon (boiling range 306-394° C) is emulsified into 510 p of a mix of 4 p sodium lignin sulfonate, 45 p anhydrous potassium carbonate, 45 p anhydrous sodium carbonate, 70 p Rongalite, 60 p glycerin and the balance water. 10 p of a 10% vat dye paste of the dye C I #1101 (Caledone Jade Green) are stirred into 90 p of this clear emulsion. Prints prepared with this paste and developed as usual are said to compare favorably with those produced by methods in which commercial starch pastes are used as thickening agents.

References cited by the Patent Office:

Ger Pat 550,637 (Mocker/1932): a printing paste for vat dyes containing mineral oil emulsified with Nehal as a thickening agent.

Diserens "Technology of Dyeing and Printing," 1948, p 40-41: vat printing formulas covering the use of potash and sulfoxylate formaldehyde.

Melliand Textilber, 804-807 (1938): emulsions applied as printing thickeners are discussed and particular mention is made of Ger P 550,637 (above); printing formulas for mineral oil emulsion pastes as well as tall oil distillate emulsions are offered and practical results reported.

VAT DYEING ACRYLONITRILE POLYMERS——Ionizable Potassium Compounds Used C, 4, 07

U S Pat 2,598,120
(Du Pont——Griffith——May 27, 1952)

Difficulties encountered in the dyeing of acrylonitrile polymers or copolymers containing 85% or more polyacrylonitrile are well known, though many attempts have been made to solve this problem.

The present patent recommends the use of a vat dye of the indigo-, thioindigo or related type, alkali, a reducing agent and a readily ionizable potassium compound (preferably the carbonate). The vat dyed goods are developed by oxidation, as usual. Instead of potassium carbonate, other organic or inorganic, hot-water-soluble potassium salts (chlorides, bromides, nitrates, oxalates, etc) may be used, provided they ionize well under dyeing conditions. Dyeing has to be carried out at a pH between 10-12.5. Lower pH values (7-10) give weak shades; on the other hand, the effect of the potassium salt diminishes rapidly at a pH exceeding 12.5. A slight improvement may be noted in dyeing anthraquinoid dyes according to the same method but this effect is less marked than that obtained with indigoid or thioindigoid dyes.

The essential feature of the current invention is the application of a substantial amount of potassium salt (4 equivalent weights per 100 polymer) in addition to the alkali used for vatting the dyestuff. It has been observed that a weak shade appears only when potassium carbonate is replaced by an equivalent amount of sodium carbonate.

Other inorganic or organic alkaline materials may be added to the dyebath. This specification refers particularly to the use of aromatic amines, as dyestuff carriers in polyacrylonitrile dyeings (U S Pat 2,543,994/Du Pont, cf *Am Dyestuff Reptr 40,* 375 (1951)).

Example: A dyebath is prepared from 2 p 6-6'-di Br-4-4'-dimethyl 2-2' bis thionaphthene indigo, 10 p sodium hydrosulfite, 0.8 p NaOH and 27.g p potassium carbonate. (pH=11.4). 10 p polyacrylonitrile yarn is immersed in this bath for an hour and the bath kept at 97-98° C. The yarn is thereupon rinsed, reoxidized for one hour in 1% nitric acid at 98° C, soaped, finally rinsed and dried.

Among other references cited by the Patent Office:

U S Pat 2,371,145 (Standard Bleaching and Printing Co/1945) a vat dyeing process and apparatus: the goods are wetted with a thickened suspension of vat dye, alkali and reducing agent and passed between two isolated rollers of opposite electric charge, each connected with a power source; the current flows through the material and completes the reducing action.

U S Pat 2,318,133 (Du Pont/1943): dyeing textiles by padding with a caustic solution of a reduced vat dye and developing thereafter while the dyestuff is still in a reduced state in a mildly alkaline hydrosulfite solution of constant alkalinity.

U S Pat 2,086,831 (National Aniline & Chem Co/1937): preparing anthraquinoid vat dye powder by mixing the paste with an alkali salt of glycine, methyl- or phenylglycine and evaporating.

U S Pat 2,067,930 (National Aniline & Chem Co/1937): adding alkali salts of lower alkyl acid esters, eg, dipotassium or disodium glycol disulfate, as assistants in vat dyeing.

Sieber (*Melliand Textilber,* 141 (1926)) was first to point out the favorable results obtained in using potassium carbonate as an alkali in vat dye printing processes. That potassium salts would have superior effects in dyeing acrylonitrile fibers as compared to other alkali salts could not be expected, however.

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

November 24, 1952

CALENDAR

AATCC

COUNCIL
Jan 16, 1953; April 17, 1953; June 5, 19[illegible]

GENERAL RESEARCH COMMITTEE
(See Council dates)

NATIONAL CONVENTIONS
September 17-19, 1953 (Hotel Conrad Hilton, Chicago); 1954 (Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

HUDSON-MOHAWK SECTION
December 5, February 6, March 20, May 8 (Albany); June 19 (Outing).

MID-WEST SECTION
February 14 (Hotel Bismarck, Chicago, Ill); April 18 (Netherland Plaza, Cincinnati, O); June 20 (Outing, Lake Delavan, Wis); November 7, 1953 (Hotel Bismarck).

NEW YORK SECTION
January 30, February 27 (Hotel Statler, New York, N Y); April 17, May 22 (Swiss Chalet).

NORTHERN NEW ENGLAND SECTION
December 6 (Annual Meeting, Lowell Textile Institute).

PHILADELPHIA SECTION
Dec 5, Jan 16 (Kugler's Restaurant).

RHODE ISLAND SECTION
December 5 (Annual Meeting, Sheraton-Biltmore, Providence, R I).

SOUTH CENTRAL SECTION
December 6 (Patten Hotel).

WESTERN NEW ENGLAND SECTION
Dec 12 (Rapp's Restaurant, Shelton, Conn).

OTHER EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS
2nd Annual Symposium, Feb 3, Hotel Statler, New York.

AMERICAN SOCIETY FOR TESTING MATERIALS
1953 Annual Meeting, June 29-July 3, Chalfonte-Haddon Hall, Atlantic City, N J.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantic City, N J.

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS AND CHEMISTS (Quebec Section)
Dec 13, Jan 17, Feb 21, Mar 21 (Physical Science Centre, McGill Univ, Montreal, Que); April 17-18 (Annual Meeting, Mount Royal Hotel, Montreal, Que); June 20 (Annual Golf Tournament).

GARMENT DYERS GUILD OF AMERICA
2nd Guild Clinic, Dec 5-6, Chicago, Ill

GLYCERINE PRODUCERS' ASSOCIATION
Convention, Jan 27, 1953

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS
41st Knitting Arts Exhibition, April 27-May 1, 1953, Atlantic City Auditorium, Atlantic City, N J.

NATIONAL COTTON COUNCIL
4th Annual Cotton Research Clinic, Feb 18-20, Oglethorpe Hotel, Savannah, Ga.

NEW YORK BOARD OF TRADE (DCAT)
27th Annual Drug, Chemical and Allied Trades Dinner, March 5 (1953), Waldorf-Astoria, New York, N Y.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES
Dec 3 (Annual Meeting), Jan 14, Feb 11, March 11——all at the Hotel Commodore, New York; June 11-13 (Joint Outing with Manufacturing Chemists' Association at The Greenbrier, White Sulfur Springs, W Va.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

52-30

Education: B T C, Lowell Textile Institute.
Experience: Mill Chemist.
Age: 30; married; references; northeastern U S preferred.

11-10, 11-24

52-31

Education: B S, textile dyeing and finishing, with further college studies in chemistry.
Experience: assistant in textile application and organic chemical research.
Age: 24; married; references; position as assistant dyer or textile chemist desired; north Atlantic coast preferred.

11-10, 11-24

52-34

Education: B S, textile chemistry and dyeing.
Experience: Textile Chemist.
Age: 25; married; references; position as asst dyer or finisher, or in quality control work, desired.

11-24, 12-8

—♦ ♦—

1953 Meeting Dates, Piedmont Section

LISTED below are the meeting dates of the Piedmont Section for 1953 as announced by Clarence Hooper, Secretary:

Winter Meeting——Jan 10, Clemson House, Clemson, S C

Spring Meeting——April 11, Robert E Lee Hotel, Winston-Salem, N C

Summer Meeting —— June 12-13, Mayview Manor, Blowing Rock, N C

Autumn Meeting——Sept 12, Hotel Charlotte, Charlotte, N C

Correction

Re: List of members, 1952 Rhode Island Section Intersectional Contest Committee

ON page P650 of the Convention issue (Oct 13), the names of Gerald B Stackpole, Cranston Print Works, Webster Division and Harold V Morrell, Polymer Industries, Inc were inadvertently omitted in the list of the Rhode Island Section's Intersectional Contest Committee members. In the same listing, the company affiliation of George Wood should correctly be "The Apponaug Company".

ATTENDANCE AT '52 CONVENTION SECOND HIGHEST

Record Number of Women Attend

R I Section Paper Takes First in Intersectional Contest

BOSTON, MASSACHUSETTS, site of the founding of the American Association of Textile Chemists and Colorists in 1921, served again most notably as host city on November 6-7-8 as the Association convened for its 1952 Annual Meeting at the Hotel Statler. Previously the Massachusetts capital had also played host to the AATCC during its silver anniversary meeting in 1946.

Actual registration at the '52 parley, as announced by Convention Chairman George O Linberg (Synthron, Inc) was 1731, the second largest in the Association's history. The figure included over 260 women members and wives, a new record. Attendance at the Annual Banquet on Saturday exceeded 800 and was topped only by that at the Boston Pops Concert the previous night.

The exhibits of 54 concerns, as well as an extensive display by the AATCC's Research Laboratories, attracted considerable attention.

For the fifth time in the 13-year history of the Intersectional Contest, the Rhode Island Section took first place with their paper "Printing of Acrylic and Polyester Fibers". Second place went to the Philadelphia Section for their paper "The Stripping of Color from Hydrophobic Fibers", and third place, to the New York Section for their paper, "Factors Influencing Dye Fixation on Padded Rayons". By virtue of their success this year, the Rhode Island Section moves into the lead in the number of "firsts" received in the Contest's history, one more than the New York Section. The Contest was held Saturday morning in the Grand Ballroom. Results were announced by Contest Chairman Frank J O'Neil at the Annual Banquet.

Formal activities got underway on Thursday morning with the 184th Council Meeting, President C Norris Rabold, presiding, during which the formation of a new section centered around Washington, D C, was approved. Designated secretary *pro tem* of the new section was Dr Walter Scott, U S Dept of Agriculture.

The first of the Technical Sessions began on Thursday afternoon, embracing talks on "The Human Side of Textiles". According to Ernest R Kaswell, Technical Program Committee Chairman for the Convention, the Association has felt the need for "touching on certain areas pertaining to the textile industry which research men don't know too much about", and the idea of this session was "to acquaint the textile research people with the physiological aspects of clothing as they relate to textiles". Introductory remarks by Edward R Schwarz, head of the Textile Division, Massachusetts Institute of Technology, preceeded the three technical papers.

Technical sessions continued all day Friday with the presentation in the Ballroom of three papers in the morning and three in the afternoon. Simultaneous with the morning session, in the Bay State Room, Edmund A Leonard, Alexander Smith Carpet Co, served as chairman of a symposium on stream pollution, during which the steps taken by government and industry groups to alleviate the problem were discussed.

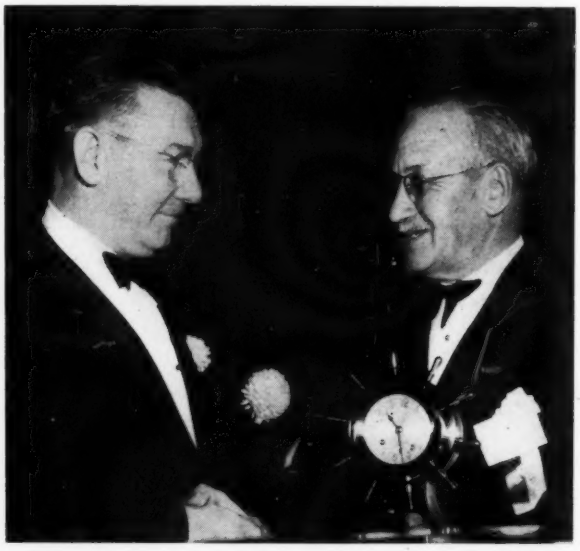
The Olney Medal Award, initiated for this Convention as a special luncheon event on Friday, went to Werner von Bergen, Forstmann Woolen Company. Presentation of the medal was made by President Rabold. Giles E Hopkins, Wool Bureau, Inc spoke on "The Medalist—The Man" and Dr John R Dillon, Textile Research Institute delivered the traditional "The Medalist—The Scientist". In his acceptance address, Mr von Bergen spoke on the three keys of the textile chemist: time, temperature and concentration.

A Friday Night feature, as previously noted, was the symphony concert of the Boston Pops Orchestra in the Grand Ballroom.

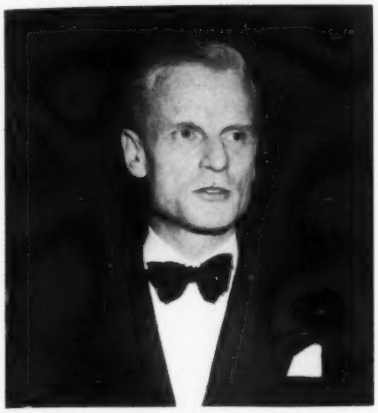
Approximately 250 attended the Textile Schools Alumni Luncheon on Saturday afternoon, at which a majority of the schools were represented at the head table by their top officials.

C Wendall Lever of Wanskuck Co, Chairman of the host Northern New England Section welcomed those present at the Annual Banquet on Saturday evening, at which guests representing domestic industry and those from abroad were present. Walter J Hamburger, Fabric Research Laboratories, Inc, Boston, acted as master of ceremonies.

Following the announcement of the Intersectional Contest winners by F J O'Neil, Professor Percival Theel presented the second annual AMERICAN DYESTUFF REPORTER AWARD to J J



C Wendall Lever (left), Northern New England Section Chairman, presents George O Linberg an engraved clock in appreciation of his service as Chairman of both the 1946 and 1952 Conventions.



P W Cunliffe, Society of Dyers and Colourists, Extends Greetings

Iannarone and R J Thomas for their paper "High Temperature Dyeing of New Synthetic Fibers". The third author, C G Lyle, was unable to be in attendance.

P W Cunliffe, chairman of the Fastness Test Coordinating Committee of the British Society of Dyers and Colourists next brought greetings and presented President Rabold with a specially bound copy of the lastest SDC Symposium on Tinctorial Arts.

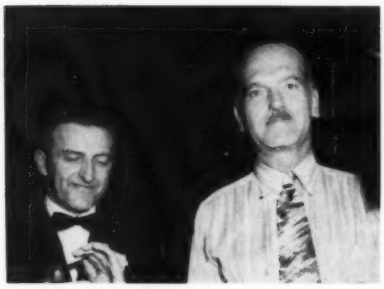
Mr Rabold followed with "The President's Address", after which Past President Henry F Herrmann, General Dyestuff Corporation, presented him with the past president's pin. Mr Rabold's term as president expires at the end of the year. During the evening Mrs Rabold was presented with a large bouquet of red roses in appreciation of her assistance to President Rabold in Association affairs.

Vice President Arthur T Brainerd of the Western Region invited all to attend the 1953 Convention in Chicago at the Conrad Hilton Hotel. He promised that plenty of rooms would be available as well as excellent exhibit space.

In appreciation of Mr Linberg's efforts as Convention Chairman for both the 1952 and 1946 meetings, Mr Lever presented him with an engraved clock.

Guest speaker of the evening was William H Ruffin, President, Erwin Mills, Inc, Durham, N C and chairman of the National Association of Manufacturers, who urged industry to stir into life new desires and aspirations.

William H Ruffin, President, Erwin Mills, Guest Speaker



Dr W George Parks, attired in a resounding shirt of the new synthetics, receives the plaudits of Intersectional Contest Chairman F J O'Neil. Dr Parks represented the first-prize winning Rhode Island Section

ALL CONVENTION PAPERS WILL BE PUBLISHED IN FUTURE ISSUES OF THE PROCEEDINGS

THE LADIES ADD GLAMOUR TO THE ANNUAL BANQUET

HEAD

ANNUAL

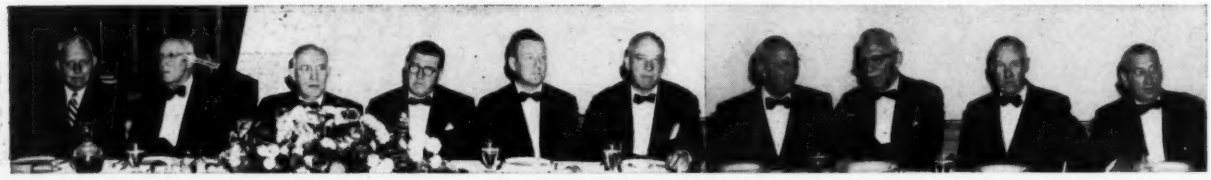
TOP TIER, LEFT

(L to r): Percival Theel, National Chairman, Publications Committee; ISO Delegates Dr Wilhelm Weltzien, Technical University, Aachen, Krafeld, Germany, Dr Paul Rabe, Farbwerke Bayer, Leverkusen, Germany and J P Niederhauser, Compagnie Francaise des Matieres Colorantes, Paris, France; Henry F Herrmann, Past President; C Norris Rabold, President; William H Ruffin, Erwin Mills, Inc

MIDDLE TIER, LEFT

(L to r): Albert E Sampson, Assistant Treasurer; Harold C Chapin, Secretary; Arthur T Brainerd, Vice President, Western Region; William R Moorhouse, Treasurer; Samuel L Hayes, Vice President, Southern Region; Arthur W Etchells, Vice President, Central Atlantic Region

BOTTOM TIER, LEFT



(L to r): Edwin Wilks, Jr, Manager, Slatersville Finishing Company; Tracy A Adams, Textile Industrialist; Francis W White, President, American Woolen Company; Elmer C Ward, President, Goodall Sanford, Inc; Oliver Moses, III, President, Worumbo Manufacturing Company; H D Ruhm, Jr, President, Bates Manufacturing Company; E Dean Walen, Vice President, Pacific Mills; Raymond Curtis, President, The Kenyon Piece Dye Works, Inc; W A Traver, Chairman of the Board, Franklin Process Company; James Stevenson, Vice President, Bradford Dyeing Association

TABLES

BANQUET

TOP TIER, RIGHT

(L to r): Walter J Hamburger, Assistant Convention Chairman; George O Linberg, Convention Chairman; P W Cunliffe, Society of Dyers and Colourists; C Wendall Lever, Chairman, Northern New England Section; Ernest J Chornyei, Chairman, Rhode Island Section; Frank J O'Neil, Chairman, Intersectional Contest

MIDDLE TIER, RIGHT

(L to r): Raymond W Jacoby, Vice President, New England Region; Thomas R Smith, Past President; William D Appel, Past President; Charles W Dorn, Chairman, General Research Committee; Rudolph C Geering, Chairman, Western New England Section; Carl Z Draves, Past President

BOTTOM TIER, RIGHT

(L to r): Richard E Olney, Supt, Wannalancit Textile Company; W H Hough, Vice President, Enterprise Dye Works, Inc; Frank Bussiere, Manager, Northfield Mills, Inc; T L Clark, Treasurer, Talbot Mills, Inc; Gilbert Verney, President, Verney Corporation; Harold J Walter, President, Bachmann-Uxbridge Worsted Corp; Abbot Stevens, Vice President, M T Stevens & Sons Company; Henry M Bliss, President, Massachusetts Mohair Plush Company; R C Dick, President and Treasurer, Naumkeag Steam Cotton Company; G E Sinkinson, President, Sayles Finishing Plants, Inc

Prof Percival Theel (left) presenting the AMERICAN DYESTUFF REPORTER AWARD to J J Iannarone (center) and R J Thomas

Past President Henry F Herrmann (right) Congratulates President C Norris Rabold

HEAD TABLE, TEXTILE SCHOOLS ALUMNI LUNCHEON

(L to r): George Walker, President, New Bedford Textile Institute, C Norris Rabold, AATCC President; Edward R Schwartz, Professor in Charge of the Textile Technology Division, Massachusetts Institute of Technology; Richard S Cox, Dean, Philadelphia Textile Institute; G Nathan Reed, Dean of Faculty, Lowell Textile Institute

(L to r): Bertrand W Hayward, Director, Philadelphia Textile Institute; Harold C Chapin, AATCC Secretary; W D Fales, Head of the Textile School, Rhode Island School of Design; C Wendall Lever, Chairman, Northern New England Section, AATCC

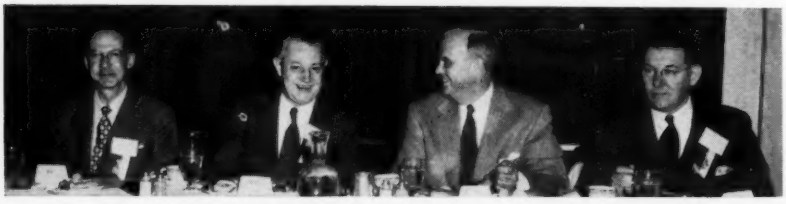
(L to r): Herman A Dickert, Director, A French Textile School, Georgia Institute of Technology; Leslie B Coombs, President, Bradford Durfee Technical Institute; J Milton Washburn, Chairman, Alumni Luncheon

(L to r): Joseph F Vaughan, President, Institute of Textile Technology; Martin J Lydon, Lowell Textile Institute; Malcolm E Campbell, Dean, School of Textiles, North Carolina State College; J Foster, New Bedford Textile Institute; George O Linberg, AATCC Convention Chairman

TEXTILE SCHOOLS ALUMNI LUNCHEON

OLNEY MEDAL AWARD

Werner von Bergen, Forstmann Woolen Company (center), is presented the 1952 Olney Medal by President C Norris Rabold (right) as Walter J Hamburger, master of ceremonies, looks on



Head Table, Olney Medal Award Luncheon
(Top, l to r): Norman A Johnson, Howes Publishing Company; George O Linberg, Convention Chairman; John H Dillon, Textile Research Institute; Werner von Bergen, Olney Medalist

(Bottom, l to r): Walter J Hamburger, Assistant Convention Chairman; C Norris Rabold, President; Giles E Hopkins, Wool Bureau, Inc; C Wendall Lever, Chairman, Northern New England Section

Forstmann Woolen Company representatives

The Medalist's Family

OLNEY MEDAL AWARD LUNCHEON
NOVEMBER 7, 1952
HOTEL STATLER, BOSTON, MASS

AATCC RESEARCH LABORATORIES EXHIBIT

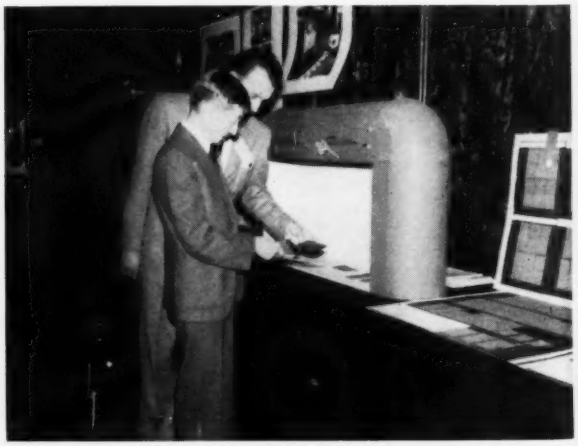
Research Staff
(L to r): G R Thompson and G J Mandikos, research associates; Hazel Crane, technician; Dr Harold W Stiegler, Director of Research; E P Johnstone, research associate. Other members of the staff include C A Siebert and H E Glidden, research associates (pictured below) and Vera B Meehan, secretary

In the AATCC exhibit on Dry Cleaning was a working model of a train of dry cleaning machinery. Checking the operation of the model is R T Graham of the National Institute of Cleaning and Dyeing

H E Glidden, AATCC Research Associate, describing the many uses of the Accelerotor to a Convention visitor

(Photos by G J Mandibos)

Attracting many visitors was the exhibit showing the results of a thorough investigation by the AATCC regarding the interchangeability of common salt and Glauber's salt in acid dyeing of wool



C A Seibert and M J Babey discussing the results of recent inter-laboratory tests conducted by the AATCC Research Committee on Lightfastness

Philadelphia Section——

HOSIERY AND THE ENDLESS MARCH OF NEW FIBERS*

VIRGIL T HARTQUIST

Genl Mgr, Jefferies Processors, Philadelphia, Pa

INTRODUCTION

TODAY, the available yarns, natural, regenerated and synthetic, for hosiery are so numerous that the knitter and dyer are finding it difficult to keep their equilibrium. The new fibers of the twentieth century can probably be counted between twelve and eighteen. In their short lives, many changes and improvements in each has characterized their existence, and as each appears, every branch of the textile industry hopefully conducts experiments to determine if this is the fiber best suited for its end uses. The hosiery industry is no exception and has or is taking its fling with all the fibers.

Let's consider these fibers against the technological background of silk, wool, and cotton, which we have known for thousands of years. We evaluate these fibers with physical and chemical statistics that are related to centuries of human conscious and subconscious reactions of likes and dislikes. In our technical journals we read such statements as that "X Fiber, of all new fibers, most closely resembles silk, wool, or cotton in some particular aspect".

Shortage or high price of desirable fibers, new or old, may temporarily promote the use of some new or less desirable fiber, giving a false evaluation of its intrinsic value. Thus, we cannot wisely evaluate a new fiber for hosiery if we are influenced only by its newness.

Among the new fibers, we will probably find more than one with physical and chemical characteristics appealing to the consumer. However, this period will probably be marked by many mistakes of choice, false starts and remarkable claims.

FIBER PROPERTIES AND HOSIERY

So, in this embryonic stage, let us try some appraisals of the fiber picture as regards hosiery usage.

Appearance is probably the most desired feature in a yarn for ladies' full-fashioned hosiery. Filament nylon with high tensile strength and good extensibility permitting the use of low denier yarn for sheerness is, at the present time, the chief fiber used by this industry.

V T Hartquist

The recent advent of new wholly synthetic fibers to the old natural and man-made (regenerated) fibers that were available to the hosiery field up to the invention of nylon, the first wholly synthetic fiber, is posing new problems to the hosiery manufacturer. To present these problems more clearly, the dyeing, pilling, moisture absorptiveness, and abrasive resistance of old and new fibers are discussed in relation to the requirements for hosiery that are important to the consumer, namely, appearance, comfort, and wear.

Seamless hosiery, such as men's socks and children's and ladies' anklets are knitted mainly with staple rather than filament yarns. In this type of hosiery, in addition to appearance, comfort and wear seem equally important to the consumer. The product is also more varied to suit specific usages and one yarn has never sufficed as in full-fashioned hosiery, where, prior to nylon, silk was practically the only fiber used.

Established natural fibers in seamless hosiery are cotton, wool and a small amount of cashmere and silk. Present competitive man-made and wholly synthetic fibers include rayon, acetate, nylon, "Dacron" polyester fiber, "Orlon" acrylic fiber, dynel, "Acrilan" acrylic fiber, "Vicara" zein fiber, and X51 acrylic fiber.

Physical characteristics influence the consumer's choice as regards appearance, comfort and long wear, so let us try to compare and evaluate the newer fibers in the light of our vast information of the natural fibers.

APPEARANCE———Appearance is a two-fold problem: first, the initial appearance and, again, after long wear. Also, filament yarns react differently from staple types.

The initial appearance of staple yarns in hosiery is usually satisfactory to the consumer. Long wear detracts from many of these because of pilling of the surface and poor fastness to washing or light of the dyestuffs used.

Under fastness to washing, which in hosiery is more important than fastness to light, economics and choice of dyestuffs permit all the fibers, natural and man-made, to be dyed to the highest necessary commercial standards.

Pilling is an abrasive brushing up of the surface fibers into little spheres, or pills. Cotton exhibits little pilling, wool considerable, depending on twist and grade of wool. Sufficient hosiery has been manufactured from nylon, "Dacron", "Orlon" and dynel to give some evaluation of these fibers. Wool, Vicara, and Aralac produce pills on the surface but, because of lower tensile strength, the pills fall or are brushed off. From the small amount of information available from practical wear tests, it would appear that the acrylic fibers pill less than nylon or "Dacron". However, we do have definite experience that "Dacron" is highly resistant to wet pilling or the abrasive action which occurs in dyeing.

Related to appearance after wearing is the attraction of some of the hydrophobic synthetics for lint and dust. The static electrical charge can probably be attributed to low conductivity of these exceedingly dry fibers. Present attempts to regulate the static electricity are based on the use of finishing materials of positive or negative charges or with hygro-

* Presented before the Philadelphia Section on the afternoon of April 25, 1952 in the Berkshire Recreation Hall of the Berkshire Knitting Mills in Reading, Pa.

scopic chemicals, such as ethylene glycol. Most of these are not wash fast for the life of the hosiery.

COMFORT ——— Generally, comfort of a fiber in hosiery can also be predicted by physical and chemical characteristics. Perhaps comfort means different desirable features to various consumers. Obviously, one must rule out objections by individuals with real or imagined idiosyncrasies or allergies toward specific fibers.

Also, for personal reasons, filament hosiery are sometimes preferred to staple. Normally, however, comfort is associated with softness, resilience and absorbency, and all spun-staple yarns produce this effect better than the same fiber in its filament state.

Softness in each yarn is relatively controlled by decreasing the diameter of the individual filaments used in spinning. Low twist produces softer yarns, and loose stitches give a softer fabric than tight. Other factors also influence softness, so that, when fiber comparisons are made in hosiery, all conditions must be standardized.

In our reactions to the natural fibers over the years, we all probably label cashmere as the softest, followed by wool, cotton, silk and linen. What are the favorable physical constants that generally contribute softness to a fiber? An interesting comparison can be made between two cellulose fibers, cotton and linen, as regards a physical characteristic influencing softness. These two fibers chemically are practically identical, but the arrangement of the molecules in the fibers are quite different. In linen, or flax, they are highly oriented, lying side by side, parallel to one another along the length of the fiber; whereas in cotton, although some fibers are parallel, a greater proportion are arranged at a slight angle, or divergence, from a straight line.

High molecular orientation in fibers usually contributes a more harsh, unattractive hand as exemplified in the poorer hand of linen against cotton.

Other properties usually found in highly oriented fibers are high tenacity, low elongation, brittleness, higher luster, low moisture absorption, good stability to chemicals and low dyeing affinity, while, in contradistinction, poor orientation usually produces low tenacity, high elongation, pliable yarns, low luster, high moisture absorption, low chemical stability, high dyeing affinity and a warm and soft handle. The higher dye affinity of linen is an exception to the general rule. It may be interesting to list the fibers in approximately the class they belong.

HIGH ORIENTATION

"Dacron", "Orlon", dynel, "Acrilan", "Vinyon", "Velon", nylon, "Saran", linen, Fortisan and high-tenacity rayons.

MODERATE ORIENTATION

Silk, cotton, viscose rayons and acetate of normal tenacity.

LOW ORIENTATION

Wool, "Vicara", "Aralac", "Azlon".

When fibers both natural and synthetic do not possess intrinsic softness, the dyer and finisher by the judicious use of chemical softeners can develop an attractive hand. If the hosiery has a long wear cycle, it will be obvious to the consumer that these softeners are not fast to washing and the original basic hardness of the yarn reappears. Unfortunately, synthetic detergents are becoming popular with the housewife, and these products remove softeners much faster than soaps.

Also, it is interesting to observe that the softest of the natural fibers, cashmere, requires no softeners. In fact, we have in every instance noticed a definite depreciation in hand with the application of any softener.

Moisture regain also contributes considerably to comfort in hosiery and is an important factor related to apparent softness. Chemical and physical structure determines the moisture regain of the fiber. As we have noted before, highly oriented fibers, which also are more crystaline, have low attraction for water. The presence in the molecule of chemically reactive Polar groups, such as the hydroxyl groups in cellulose and the carboxylic groups in wool, on the other hand, make fibers hydrophilic.

Low moisture regain seems to be a common property of most synthetic fibers. No one claims that these characteristics contribute to the comfort of any of the hosiery made from these fibers. The consumer awareness of the low moisture regain in some fibers has promoted the use of humetic or hygroscopic finishes in both full-fashioned filament and seamlesss staple hosiery made of nylon.

LONG WEAR ——— Long wear in hosiery is the third important feature sought by the consumer.

The sequence of softness in the natural fibers is almost in reverse to softness of fiber, as linen, cotton and silk assume a dominant advantage over wool and cashmere in wear. Tensile strength may contribute to long wear in some degree, but resistance to abrasion is the prime factor in long-wearing hosiery.

Nylon and "Dacron" possess high resistance to abrasion. Acrylic staple fibers, such as "Orlon," dynel, "Acrilan" and probably Acrylic Fiber X51 compare favorably with cotton. "Vicara" and "Aralac" have lower resistance, being in the category of soft wool.

Although accurate large-scale statistics are unavailable on causes of failure in silk hosiery, holes in heel and toe from abrasion were a major factor. Today, with 98% of all full-fashioned ladies' hosiery made from nylon, failure because of abrasive action is practically unheard of. Low coefficient of friction, permitting loops to slide over each other easily and readily permitting pull threads, accounts for most of the failures in this type of hosiery.

In spun-nylon socks, failure due to abrasion at heel or toe practically never occurs. Such hosiery must be of the cheapest, lightest construction to wear out even in a year's normal wear in the average wardrobe. I have worn spun-nylon hosiery since 1946 and have yet to experience a 'hole in the toe'. The only reasons to discard spun-nylon hosiery still in use after six years are poor appearance of the hose from excessive pilling or ennui of the wearer from looking at the same socks. In long wear or service before failure, nylon and "Dacron" are so far superior in hosiery to all other fibers as almost to forbid comparison.

THE SEARCH FOR THE IDEAL HOSIERY FIBER

So our consumer is looking for appearance, comfort and long service from his or her hosiery. Can one fiber in our present knowledge satisfy all these demands? This country does not possess an economy of scarcity, such as that of prewar Germany where synthetic chemicals, detergents or fibers must be promoted for the well being of the nation as a whole. We need not foster particular products for patriotic reasons, but synthetic materials here must really earn their position in the sun.

Wool has many failings as a hosiery fiber. If untreated for shrink-resistance, it fulls and shrinks until stockings or socks made from it must be disposed of before they are actually worn out. Wool that has been shrink-resisted by one of the many methods based on halogens in some form has such low resistance to abrasion as to exhibit poor wear. This is not due to the shrink-resist process; wool in hosiery just has poor resistance to abrasion in general. Nevertheless, it is not claimed that halogenation of wool increases its resistance to abrasion or enhances its tensile strength. Azlon or regenerated protein fibers do not shrink similar to wool on washing, but have less resistance to abrasion and lower tensile strength.

Cotton, silk and linen as hosiery fibers are the first steps away from the soft resilience of wool. They possess the necessary moisture regain for comfort, but higher orientation of the molecules does not contribute softness. They are still far from nylon and "Dacron" polyester fiber in abrasion resistance but superior to wool, "Vicara" and "Azlon" fibers. They might be classified as intermediate hosiery fibers in that they have some degree of all the

desirable characteristics of good hosiery yarns.

Regenerated cellulose fibers, probably because of their low resistance to abrasion and poor elasticity, have not had good consumer acceptance in hosiery.

Among synthetic fibers, we may eventually find ideal hosiery yarns. It is true that contemporary synthetic fibers, however, leave much to be desired for use in hosiery. Their failure lies mainly in not giving sufficient comfort, in losing appearance through pilling, and in lint accumulation in long wear.

We may be critical of the new fibers, but cannot praise too highly the men and their companies which conceived and produced them. Their work, beginning only a few years ago, has opened a new field of organic chemistry, of which the present fibers are only the initial products. It would seem illogical to assume that the first synthetic yarns should be the ultimate. Is it impossible in the synthesis of fibers to produce properties which include moisture absorbency and softness as well as tensile strength and resistance to abrasion? Incidental to all others but of paramount importance to the dyer is the probability that moisture absorbency and softness in a synthetic will also mean better dye receptivity.

BLENDS FOR HOSIERY ——— Until more and better synthetics are available for the hosiery manufacturer, another approach can be made to produce yarns which will have properties of good appearance, comfort and long wear. This method is the judicious blending of fibers, an idea that is not new. Cotton reinforcements have been used for years to extend the wear of woolen hosiery. Cotton is added to wool to increase tensile strength; silk, to wool blends for strength, and so on. Unfortunately, the consumer has the conception that cotton is always blended with wool because it is cheaper.

In the average consumer's mind, any fiber blend is inferior to a straight fiber composition. Nothing in advertising seems to combat this misconception. Each fiber producer of natural man-made, or synthetic fibers, is usually selling his own product, good or bad, for 100 percent use in any article. Manufacturing problems are not simplified by the use of two fibers rather than one, and the dyer's problems are multiplied by blends. Regardless of problems and motives, an intelligent blending of fibers can give the consumer an article possessing qualities sometimes more desirable than 100-percent-fiber yarns.

In hosiery, the addition of wool to nylon increases softness and moisture absorption. Or we can say that the addition of nylon to wool increases abrasion resistance for longer wear and decreases the tendency of the sock to full and shrink in washing. Another example is the addition of a regenerated protein fiber, such as Vicara, to nylon to achieve the same end of greater comfort combined with long wear.

In blending fibers, the first consideration is the specific properties desired for the end use. Before proceeding too far, it would be wise for the spinner and hosiery manufacturers to consult with the dyer, because it may be impossible or uneconomical, in production to dye a good union on certain combinations. The difficulty arises basically because a most logical blend adds the strength of an oriented fiber to the softness and moisture absorbency of a poorly oriented fiber. The highly oriented fiber is chemically unreactive and requires drastic action, such as the use of high temperatures or the use of chemicals that swell the molecular structure and permit coloring of the fiber.

The easily dyed fibers in a blend may be easily attacked by chemicals and abnormal conditions, so that formulas developed for dyeing a single fiber usually must be modified to protect the fiber susceptible to chemical attack. Also, in many instances a two-bath dyeing procedure is necessary to dye each fiber properly. Unfortunately, from the dyer's viewpoint, the blending of fibers is not an easy approach to better hosiery. But fibers of great difference in orientation are often necessary to build better customer acceptance. Extreme examples of blends difficult to dye union are wool and "Dacron" or wool and "Orlon". Shrink resist the wool and the problem increases because the wool fiber then becomes even more subject to chemical attack. Fiber combinations that are less extreme in degree of orientation and that are easier to dye union are wool and nylon, or wool and cotton, or wool and silk.

Blend combinations are so numerous and methods of dyeing so varied that it would be impossible to discuss here each and every one. The individual problem of spinning, knitting, dyeing and finishing any particular blend requires a complete series of experiments to produce the technical and economic answers.

CONCLUSION

The hosiery customer has much to gain with the advent of new fibers. We do not yet have perfect hosiery yarns but the discovery and existence of so many new fibers prophesies and predicts that better yarns are to come.

Over a year ago, 25 American companies were at work on new fibers. Today in laboratories here and abroad, that figure must be surpassed. As the experiments bear fruit and pass into pilot plant and finally into mass production, all the fibers adaptable to hosiery will require an enormous quantity of work in the mills.

However, new fibers in the future should present fewer, rather than more problems as we learn to handle new fibers better. The current synthetics have presented problems in spinning, knitting, dyeing and finishing because low moisture regain has produced high static electrical charges, plastic elasticity has brought winding, knitting, sewing and seaming problems, and poor dye receptivity has caused dyeing difficulties.

The research chemist realizes these problems and, because the work is relatively just beginning in synthetic fibers, we should expect a bright and interesting future.

Meeting Report—— New York Section Advisory Committee on Static Electricity

October 13, 1952
Hotel Statler, New York, N Y

THE first formal session of the committee was held October 13, 1952, at 2 p m, in Conference Room 7, Hotel Statler, New York, N Y. In attendance were: Sidney M Edelstein, Chairman, Dexter Chemical Corporation; Robin Beach, Beach Engineers Associated; R W Gaines, substitute for F C King, Carbide & Carbon Chemical Company; Dr S W Brainard, E I du Pont de Nemours & Co, Inc; H C Woodruff, Alkyd Products Engineering, General Electric Company; H C Haller, Forstmann Woolen Company; Dr O I Bloom; and J J McGuinness, Dexter Chemical Corp. J B Goldberg, J P Stevens & Co, was unable to attend.

Mr Edelstein pointed out for the benefit of those who did not attend the early Summer meeting that the purpose of the committee was two-fold: to recommend fields of research related to static electricity for study by a national committee of the AATCC as well as a subject for a paper on static to be presented in the Association's annual Intersectional Contest.

During the Summer committee members were requested to forward to Mr Edelstein recommendations for study by the committee. Three letters were received, and were read by the chairman.

Mr Brainard suggested the following:

1) *A theoretical study of static formation on textiles.* The goal would be to add to our understanding of static. Basic knowledge would be useful in the many phases of textiles. Better understanding of the mechanism by which static is produced might lead to new corrective and preventive measures. The work would have to be done by a top-flight theoretical physicist.

2) *Comprehensive study of present methods of measuring static with the object of choosing the best one for standardization.* This might have to be done by several investigators comparing the various methods in particular fields.

3) *Correlation of present test methods of measuring static with actual experience.* This would require work by a task force.

4) *The development of an easily portable instrument for measuring static.*

Mr Haller's letter stated: "It would seem that the common ideas of a means for measuring static electricity and a method for developing charges on the surfaces of fabrics would have to be worked out. Then, in conjunction with this are the many types of fabrics with different kinds of fibers and surface characteristics".

Two suggestions were forwarded by Dr Bloom:

1) That on a plant level the responsible authorities learn all they can about the problem by a review of the literature and an exchange of ideas, with the committee acting as a central control for the pool. Specifically, once every month or every two months the committee might send a questionnaire to a selected group of plants to learn what progress that organization's laboratory, the safety department and operating department are making with the problem of static. These thoughts then should be circulated to the entire pool. Each plant should have a library on the subject including a recent report of the Bureau of Mines on the problem of static in hospitals.

2) That the textile industry follow the procedure common to other industries, namely, to assign the problem to a reliable research group which will actively study it and make interim and final reports. I have the feeling that were the textile industry to join hands with one or two major industries in which static is a problem (printing and hospitals) and then present a unified piece of research to be done, that the problem would be solved.

Dr Bloom showed the committee a piece of cotton which had been impregnated to lower the resistance to 300 ohms. However, it was pointed out that the color was black due to graphite and that dyeing and bleaching were impossible with it.

On the hospital question, it was pointed out that the American Hospital Association are the people to contact, and Dr Bloom said that he would discuss static with them and report at the next meeting.

The Bureau of Mines report mentioned by Dr Bloom was identified by Mr Beach as Report #56. He said that it was comprehensive but did not shed too much light on the subject of static in general. Mr Beach, and the majority of members agreed with him, said that the present instruments for determining static charges were totally unreliable since too many extenuating factors were involved in their use.

Mr Beach told the story of the girl in the powder plant who was forced to wear all garments of cotton while testing bridges of detonators. One night she came in with synthetic fiber garments on, was not checked due to illness of the inspector, and before the night was over a static discharge detonated a cap, and she lost a hand. For two years she had not had an accident.

Dr Brainard said that many laboratory instruments were of value for study of static, but they were too bulky and too difficult to operate under actual mill conditions.

Mr Gaines told of a method his company was employing to test for static and said that he would send reprints to committee members.

After the broad general discussions on static, it was generally agreed that instruments were a number one necessity for any kind of research program and number two was a more comprehensive study of static in general. The committee delegated Mr Edelstein, Mr Beach and Mr Woodruff to meet with Kenneth Barnard's National Committee for Evaluation of Antistatic Finishes on Textiles at the Boston Convention to insure against duplication of effort.

The committee agreed that a comprehensive bibliography would be exceptionally helpful to all on static. Members will route through the committee all sources of information which they are familiar with.

At the next committee meeting, work will be started on drafting a committee report.

Respectfully submitted,
J J McGUINNESS, *Secretary*

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Future Meetings, H-M Section

FUTURE meeting dates of the Hudson-Mohawk Section, as announced by William A Nelson, Secretary, include the following:

December 5, February 6, March 20 and May 8———Albany, N Y

June 19———Outing. (Site to be determined).

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South Central Section Meets Dec 6

THE Fall Meeting of the South Central Section will be held at the Patten Hotel, Chattanooga, Tenn.

The technical session will feature L M Miller, Armour Chemical Division, who will speak on "Fat-derived Chemicals As Applied to the Textile Industry".

W O Henley, treasurer and comptroller for American Aniline Products, Inc, will be the banquet speaker. His subject: "Dieing Then and Now". Election of officers will also be held at the banquet.

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Meeting Report—— Mid-West Section

October 4, 1952
Bismarck Hotel, Chicago, Ill

THE fall meeting of the Mid-West Section was held at the Bismarck Hotel, Chicago, Illinois on October 4, 1952.

The afternoon meeting was called to order at 2:45 P M by Vice-Chairman John Gordon Stott. He then introduced Helen Sisson whose talk, "The Interdependence of the Dyer and the Stylist" gave a fresh approach to colors.

A short business meeting followed in which the secretary's and treasurer's reports were read and approved. Then came reports by Corporate Membership Chairman Elliott Morrill, Technical Committee Chairman Merrill Morris, and Joseph Jones (Council Meetings).

Archie Alexander, Chairman of the Nominating Committee, announced the following nominations for officers, councilors and sectional committee members for the coming year:

Chairman—Alfred J Olson.
Vice-Chairman—John Gordon Stott.
Treasurer—Kirk P Ferguson.
Secretary—Victor H Lawrence.
Councilors—Elliott Morrill, Art Hultburg and Sam Klein.

Sectional Committee — Scott Brainard, Kenneth Giese, Peter Meeuwsen and John Nerl.

Corporate Member Committee—Walter Jaeger, *Chairman*, Al Roy, Jack Voss and William Paine.

When no additional nominations were made from the floor, a motion was made, seconded and approved that the Secretary cast a unanimous ballot for the candidates named by the nominating committee.

The afternoon meeting, which was attended by approximately 100 members and guests, adjourned at 4:30 P M.

Dinner was held at 6:00 P M and attended by 106 members and guests. After dinner Chairman Olson introduced the speaker of the evening, Henry Millson, whose paper was entitled "Miscroscopical Dyeing Phenomena Studies with the Microdyescope".

Respectfully submitted,
VICTOR H LAWRENCE, *Secretary*

Meeting Report—— New York Section

October 24, 1952
Kohler's Swiss Chalet, Rochelle Park, N J

A MEETING of the New York Section was held on Friday evening, October 24, 1952 at Kohler's Swiss Chalet, Rochelle Park, N J. A social hour and dinner preceded the meeting. In the absence of the Chairman, Weldon G Helmus, the Vice Chairman, John H Hennessey, presided.

Mr Hennessey announced the appointment of the following nominating committee to present a candidate for councilor for 1953 at the next meeting: Paul J Luck, Chairman, Herman E Hager and George L Baxter.

The technical program consisted of the presentation of a paper entitled "Ion Exchange Resins in the Textile Industry" by H C Borghetty, J J Bernard and J C Winters of Rohm and Haas Company, Inc. The presentation was made by Mr Borghetty and was illustrated by slides.

The attendance was approximately 125.

Respectfully submitted,
NORMAN A JOHNSON, *Secretary*

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319 Attend Joint Meeting at Philadelphia

THE Philadelphia Section, in association with the Philadelphia-Wilmington Color Group, held its regular meeting at the Penn Sheraton Hotel, Philadelphia, Pa, Friday evening, October 24, 1952, with 319 members and guests in attendance.

Chairman Edward Diehl, Ankokas Dyeing & Processing Co, introduced Chairman of the Tellers Committee Ernest Burrell, Roxborough Co, who gave his report on the election of officers for 1953. Officers elected for 1953 are as follows:—

Chairman —— Harry L Morgan, James Lees & Sons Co

Vice Chairman —— Fred V Traut, Globe Dye Works

Treasurer——Thomas H Hart, Hart Products Corp

Secretary —— Thomas J. Scanlon, Calco Chemical Co

Sectional Committee —— Percival Theel, Philadelphia Textile Institute; Ernest Burrell, Roxborough Company; Richard Shimp, E I du Pont de Nemours & Co, Inc; Henry Rotter, Artloom Carpet Co, Inc

Councilors——Edward C Diehl, Ankokas Dyeing & Processing Co; A E Raimo, John Campbell Co; S Greame Turnbull, E I du Pont de Nemours & Co, Inc; Carleton T Anderson, Ciba Co; Ernest E Rettberg, Jr, Scholler Bros; Richard B Stehle, Allegheny Dye Works

Seated (l to r): C J Monego, Chairman, Philadelphia-Wilmington Color Group; D B Judd, Chief of the Colorimetry Unit, NBS; E C Diehl, Chairman, Philadelphia Section. Standing (l to r): J W MacNeil, Publicity Chairman, H L Morgan, Vice-Chairman, and T J Scanlon, Secretary (all of the Philadelphia Section).

Mr Diehl then turned the meeting over to Program Chairman Thomas H Hart, Hart Products Corp, who in turn introduced Constantin J Monego, Chairman of the Philadelphia Wilmington Color Group, who presided as host of the evening. Mr Monego presented Dr Deane B Judd, Chief of the Colorimetry Unit, National Bureau of Standards, the main speaker of the evening. Dr Judd's presentation "Color Formulation, Color Measurement and Color Blindness" dealt with the many problems encountered by shaders in matching colors and was highlighted by the use of charts, graphs, swatches and slides. A question and answer period followed.

The next meeting of the Philadelphia Section will be held on December 5, 1952 at Kugler's Restaurant, Philadelphia, Pa.

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Mosher Slated to Speak at Next H-M Section Meeting

"THE Use of Resins and Plastics in Textile Finishing" will be discussed at the next meeting of the Hudson-Mohawk Section on Friday evening, December 5th at Jack's Restaurant in Albany, N Y. Dr Hugh H Mosher, research chemist of the Arkansas Co, Inc, will be the speaker. Dr Mosher has made a number of outstanding contributions to the application of chemistry in textile finishing.

ISO DELEGATES VISIT LOWELL TEXTILE INSTITUTE

Five delegates to the recent meeting of the International Organization for Standardization are shown while paying a visit to the Lowell Textile Institute. (L to r): P W Cunliffe, British Cotton & Wool Dyers Association, Ltd; Paul Rabe, Farbwerke Bayer, Leverkusen/Rhein, Germany; Wilhelm Weltzien, Director of the Textilforschungsanstalt, Krefeld, Germany; E Wilson, Bradford Dyers Assn, Bradford, England; J P Niederhauser, Compagnie Francaise des Matieres Colorantes, Paris, France.

Meeting Report——Rhode Island Section

October 24, 1952
Providence Engineering Society Hall
Providence, R I

AT THE Fall Meeting of the Rhode Island Section at 8:00 PM, October 24, 1952 at the Providence Engineering Society Hall, Edmund A Leonard, Superintendent, Fiber Preparation Division, Alexander Smith, Inc, delivered a paper entitled "Fibers, Textures, & Dyes for Carpets", and Ralph D Greene, Technical Service Representative, Calco Chemical Division, American Cyanamid Co, gave a paper entitled "Studies in Textile Printing, Part IV—Some Factors Involved in Vat Printing".

Alfred J Lombard, Chairman of the Nominating Committee, presented the following slate of officers for 1953:

Chairman——Ernest J Chornyei
Vice-Chairman——Arthur F McLean
Treasurer——J Wm Timperley
Secretary——Robert G Thomas
Councilors——Thorwald Larson, Edward W Lawrence
Sectional Committee —— Earle K Bush, Arthur W Grover, Boris Frankfurt, David O Payne

Forty-five members and guests attended the informal dinner at the Sheraton Biltmore which preceded the meeting, and approximately one hundred and ten attended the technical session and business meeting at the Engineering Society.

Respectfully submitted,
R G THOMAS, *Secretary*

(photos by John Trezise)

Smolens Featured Speaker at Dec 5 Meeting of Phila Section

H G SMOLENS, Buffalo Electrochemical Company, Inc, will be the featured speaker at the December 5th meeting of the Philadelphia Section at Kugler's Restaurant, Philadelphia, Pa. His talk "Hydrogen Peroxide Bleaching of Textile Materials" will highlight the Cold Bleach, Steam Bleach and White Scour processes of bleaching textile materials.

In addition, a prominent guest speaker from the Philadelphia Civil Defense Council will talk on the latest phases and developments of chemical and biological warfare.

"Target USA", the latest and most complete film of civilian defense at the factory level, will be shown in the Liberty Room prior to the meeting.

ABSTRACTS

Sodium Chlorite as a Bleaching Agent

"Outlook", *Skinner's Silk & Rayon Rec* 26, 977, August, 1952.

Sodium chlorite, $NaClO_2$, is an oxidant, but in many ways its properties differ radically from those of sodium hypochlorite, so that in using it for the bleaching of textile materials considerable research has been necessary to establish the most satisfactory conditions. Recently sodium chlorite has been found superior to sodium hypochlorite for the bleaching of nylon goods.

In any bleaching action the sodium chlorite acts through the chlorine dioxide temporarily formed. The particular reaction which occurs is largely dependent on the conditions of pH and temperature. Thus the bleaching process can be controlled by adjustment of these conditions.

Bleaching processes can be grouped according to whether they employ an acid, hypochlorite, or hydrogen peroxide as activators.

In acid bleaching processes which are very suitable for use with most cellulose fibers it is recommended to operate within the pH limits of 4-5 and temperature limits of 60-95° C, using a sodium chlorite solution containing 0.5 to 5 g of chlorite per liter; the desired pH is obtained by addition of appropriate amounts of acetic or formic acid. The bleaching action is assisted by increasing the acidity and by raising the temperature.

It should be noted that in bleaching with sodium hypochlorite or hydrogen peroxide the course of bleaching can be much accelerated and even be made dangerous by the presence of metal impurities such as iron, copper, nickel, and cobalt, whereas with sodium chlorite these metals are ineffective.

In controlling the pH of the sodium chlorite bleaching liquor it is advantageous to make an addition of 0.2 to 1.0 g p l of a buffering substance such as sodium pyrophosphate and sodium hexametaphosphate.

Sodium chlorite activated by hypochlorite is used in the United States for the continuous bleaching of cotton, and it is also used in bleaching viscose rayon staple materials. The nature of the process is especially governed by the pH (best kept within the limits of 8-9), although it is also influenced by the temperature.

For the bleaching of nylon materials a recommended process uses a sodium chlorite liquor activated by hydrogen peroxide.

Recent researches indicate that in any bleaching action where cellulose material is in the sodium chlorite liquor it is the activating influence rather than the concentration of sodium chlorite which matters most.—WHC

Notes on Mildew and Micro-Organisms in Textiles

Anon, *Textile Mfr* 78, 422-4, August, 1952.

Mildews, of which several hundred species are known, form one of three groups of micro-organisms which attack textiles. The other two groups are bacteria and various species of ray fungi. The present article is concerned mainly with mildews and molds.

Damp storage of raw cotton or any cotton goods will give rise to mildew growths from spores, dirt, or even alkaline soap residues in partly processed material. As with all fungi, nutriment is essential to growth, and under the conditions indicated, the presence of food (cellulose, starch, nitrogenous matter, etc) provides the necessary conditions of rapid multiplication of species.

Odor and color are the earliest apparent effects of mildew. The colors produced are varied; those generally encountered in textiles are green, blackish brown, red, yellow, purplish, and blackish.

The conditions most favorable to mildew growth are humidity (10-12 per cent of moisture) and warmth (65-80° F). Mildew does not develop when the moisture content is 7.5 per cent or less.

It is generally accepted that profuse perspiration is a contributory cause of mildew. Sweat consists chiefly of neutral chlorides of the nature of common salt, but it also possesses a small amount of a reducing sugar and nitrogen in the form of urea, amino acids, and ammonia.

Tendering from mildew is usually due to *Aspergillus Niger*. This may persist throughout a batch of cotton from field to finish.

Compounds of copper seem to be a most effective means of combating mildew and bacterial rot. Various methods for precipitating insoluble copper compounds on the fiber are described. Copper naphthenate is perhaps the most widely used mildew-proofing agent for outdoor fabrics, such as canvas and sacking, also for burlap and cotton duck. A minimum of 0.8 per cent of copper should be left in the fabric. Copper ammonium fluoride is also good at the same concentration.

Protection is also afforded by the Willesden process, in which the fabric is impregnated with a cuprammonium solution of cellulose. On evaporation of the ammonia, the cellulose is re-precipitated, and copper hydroxide is deposited on the fabric.

Microscopical examination can assist greatly in establishing the cause of damage.—WHC

The Finishing of Fabrics Containing Wool and Man-made Fibers

C S Whewell, P Barrett, and J Senior, *J Textile Inst* 43, P648-59, August, 1952.

The authors discuss scouring and milling and their effect on the shrinkage of blends of wool with various other fibers (Vinyon, nylon, Fibroceta, Fibro, and Fibrolane). Since most of these blends shrink very considerably when milled or washed vigorously, some type of non-shrink finish is necessary if a commercially unshrinkable material is required.

Napping is also discussed. To obtain the best results the authors recommend care in designing the fabric.

They reach the following general conclusions: blended fabrics react differently from all-wool cloths to standard finishing operations, and the effect produced is determined by a large number of factors including composition and structure. If a typical wool-type fabric is required and orthodox designs and finishes are to be used, it is not advisable to incorporate more than 30 per cent of rayon or nylon. This does not, of course, mean that it is impossible to produce an attractive 50/50 fabric, but in most cases when the proportion of rayon approaches 50 per cent designing and finishing problems begin to arise.

For example, many cloths containing 50 per cent of Fibro are easily creased, although in most cases the standard crease-resist process greatly improves the fabric. It is not, however, quite so successful on thick woolen-type materials.

There is little doubt, however, that with increasing study of finishing techniques, the appearance and properties of fabrics containing large amounts of rayon will be greatly improved, and there is at present an almost unlimited scope for development in the production of soft, resilient, noncreasing fabrics made from blends. This will be attained only by the co-operation of the chemist, the designer, and the skilled operative.—WHC

The Application of Some Synthetic Resins in the Textile Industry

A Landolt, *J Textile Inst* 43, P331-40, July, 1952.

The aim of the textile finisher has always been to subject the materials to final operations which will enhance such desirable properties as smooth surface, full handle, flexibility, suppleness or resistance to creasing. Until recently the production of these effects has been restricted, especially when fast-to-washing effects are required. Progress in this direction has been made possible only by the advent of synthetic finishing agents. Such products can be classified under two headings, namely, thermoplastic and thermosetting resins.

Thermoplastic resins, in contrast to thermosetting ones, are supplied by the manufacturers in polymerized form. They include polyethylene, polystyrene, polyacrylic acid and its amide and ester, polyacrylonitrile, polymethacrylic acid ester, and polyvinyl chloride, alcohol, and acetate.

A particular advantage of these resins in textile finishing is the formation of elastic films which are produced from solutions or emulsions of the resins on drying. Textile materials may be treated in the pad with a solution whereby the resin is applied evenly to the materials, or alternatively they are coated with the thickened synthetic resin by means of a doctor and then dried.

Thermosetting resins are produced by condensation of formaldehyde with urea, phenol, melamine, etc. As their name indicates, after setting they form hard masses (by polymerization) which no longer soften at high temperatures.

The first experiments for the fixation of urea-formaldehyde resins on textile materials were carried out by Hans John in 1918, but did not create any special interest. A method was published by British Cyanamide in 1925 for treatment of cotton, silk, and rayon with synthetic resins and filling agents in aqueous solutions. Salts which liberated acids were used to bring about condensation, and temperatures of 120-140° C were employed. Tootal Broadhurst Lee Co Ltd described a process in 1926 for the treatment of textiles with synthetic resins in such a way that the resin (e g, urea-formaldehyde) is deposited inside the fiber and the material rendered crease-resistant.

A comparison of the last two processes with respect to the chemicals and condensation products used shows a remarkable similarity. Credit is due to Tootal's, however, for drawing attention to the importance of their process for producing crease-resistant materials.

The author describes in detail some fundamental work carried out with dimethylol urea and the finish produced with it on textile materials. He believes that the possible combinations obtained with synthetic resins have not been exhausted and that interesting developments in this field may be expected in the future.—WHC

Some Effects of Light on Textiles

Anon, *Textile Mfr* 78, 364-7, July, 1952.

The effect of light on textiles is generally thought of in relation to fading and fastness only. There are, however, many other aspects of the subject.

The main factor in ordinary light fading would appear to be the actinic rays of light from the ultra-violet end of the spectrum, but in general, all parts of the spectrum affect colored materials except the red end, which does not seem to have much effect.

The presence of moisture is known to increase fading rapidly on all classes of dyes, and in conjunction with moisture, temperature has a considerable influence. In wool goods, an alkaline finish usually produces more fading than an acid or neutral finish.

Sulfur dioxide is the main industrial atmospheric impurity. It may increase or decrease fading, as compared with a pure atmosphere.

Fibers have an effect on fading, as shown by the fact that in general dyes are faster on viscose than on cotton.

Regarding the tendering effect of light on textiles, the author states that short-wave light below 4000 A is essential, and the most harmful rays appear to lie between 3900 and 2950 A. Warm, humid atmospheres are much more conducive to tendering than dry, cool conditions. Industrial atmospheres containing sulfur dioxide and nitrogen peroxide are also much worse than pure country air.

Certain vat dyes on cotton and particularly on viscose are known to have serious tendering effects. The worst effects are noted in the yellow and orange ranges. On the other hand, the chroming process in wool dyeing has a protective effect on the wool fiber against the action of light, and mineral khaki appears to prolong the life of cotton.

Exposure to light results not only in fading but in shade changes, such as blue turning to a helio tone, yellows becoming redder, etc. These changes may be permanent or temporary, and in the latter case the shade is restored to normal after the goods have been stored in the dark for a while. This is known as the "phototropic" effect, which is characteristic of certain particular dyes.—WHC

The Processing of Wool with Hydrogen Peroxide

Anon, *Textile Recorder* 70, 75-6, August, 1952.

Hydrogen peroxide is today regarded as the most satisfactory agent for the bleaching of wool, for which purpose it has the advantage over chlorine that when correctly used it has no deleterious effect on the wool keratin.

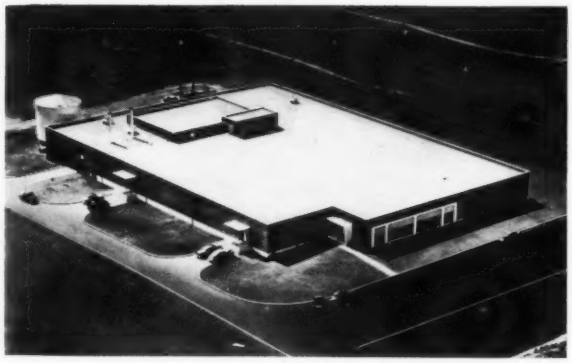
For the bleaching of wool with hydrogen peroxide, it is usual to employ a 0.5 to 2-volume solution with a pH value of the order of 9. At the start the solution may be at a temperature of 40-50° C, but it is customary to allow the liquor to cool slowly during the bleaching process, which sometimes is permitted to extend overnight. Experience has shown that the bleaching action tends to be smoother, with less likelihood of reduced bleaching action through the escape of oxygen, if sodium silicate, certain oxalates, or other substances are present to stabilize the bleaching liquor.

When all-wool or wool-cotton mixture materials are bleached by the above process in a normal manner so as to produce a satisfactory white, the ability of the material to felt or shrink during washing is not appreciably affected. If the treatment is carried beyond the normal limits, however, at first the wool is found to have a diminished shrinkability, but at still later stages it becomes much more liable to shrink. With progressive oxidation the wool becomes yellower and ultimately more swollen. In the extreme limit the fabric becomes almost gelatinous, slippery and contracted.

Although no satisfactory process involving a hydrogen peroxide treatment has so far been established for rendering all-wool fabric unshrinkable, it has been found possible to make a 50-50 wool-cotton mixture fabric completely resistant to shrinkage and felting by a prolonged mild oxidation with hydrogen peroxide, using much the same conditions as those employed for bleaching, except that the process is carried further.

No satisfactory method has yet been evolved for bleaching wool with hydrogen peroxide under acid conditions, despite the fact that this oxidant is effective under both acid and alkaline conditions when applied to substances other than wool. A possible explanation of the comparative inertness of wool towards an acidified solution of hydrogen peroxide is that under such conditions there is much less breakage of the cross linkages than is the case when the bath is alkaline, and therefore less swelling to facilitate further attack by the hydrogen peroxide on the wool substance.—WHC

NEWS



Kayser Mill, Division of Julius Kayser Co, Liberty, S C

• Julius Kayser Opens New Finishing Plant

Operations have begun in the Julius Kayser Company's new full fashion finishing plant in Liberty, South Carolina.

Part of a ten year expansion and improvement program which reportedly represents a remodeling investment of approximately $8,000,000 and an investment in new plants and equipment in the neighborhood of $6,000,000, this plant is the fourth unit Kayser has located in South Carolina.

Built by the Daniel Construction Company, builders of all Kayser's South Carolina plants, this new plant will handle all the finishing of the Kayser full fashioned hosiery produced in the South, it is reported.

• G S Robins & Company Appoint Agents

American Resinous Chemicals and American Polymer Corporations, Peabody, Massachusetts, have announced the appointment of G S Robins & Company of St Louis as their representatives in Eastern Missouri, Southern Illinois, Western Tennessee and Arkansas.

G S Robins & Company, founded twenty-nine years ago, has a staff of twelve salesmen who contact users of industrial chemicals, agricultural insecticides, and laundry and dry cleaning supplies. Extensive warehouse facilities are maintained at their location at 126 Chouteau.

• Du Pont Consolidation

The consolidation of the Boston and Providence sales organizations of the Dyes and Chemicals Division into a new organization to be known as the New England District, has been announced by the Du Pont Company. Robert R Farwell and Harold L Sager, manager and assistant manager respectively of the Providence District, will have the same positions in the new organization.

Walter H Zillessen and George H Smith, formerly manager and assistant manager respectively of the Boston District, will continue as manager and assistant manager of the New England District of the Rubber Chemicals Division.

For the present, there will be no change in the location of the two offices.

CORRECTION FOR SEPTEMBER 15TH ADVERTISEMENT—SHARPLES NONIC 261

A Sharples advertisement on Nonic 261 appeared on page X of our September 15th issue. This advertisement contained two curves, one on surface tension and one on wetting time of dilute aqueous solutions of the product. Through an error in the plates the curves were reversed.

A corrected advertisement appears on page XIV of this issue.

• Testfabrics Purchases Test Skeins

Werner Klaas, President of Testfabrics, Inc, has announced the purchase by his firm of the business of Test Skeins. The operations of the latter firm will be conducted as the Test Skeins Division of Testfabrics. Mr Klaas has also announced that his company is now located in new and larger quarters at 55 Van Dam Street, New York 13, N Y. The phone number is ALgonquin 5-1910.

• Otto B May Dies At Age of 72

Otto B May, founder and president of Otto B May, Inc, dyestuff manufacturers, died October 26 at the age of 72.

Dr May was one of the pioneers of the American dyestuff industry. In 1919, when the advent of Prohibition caused the closing of the Johann Hoff Malt Extract Co in Newark, of which he was general manager, he organized the May Chemical Works to manufacture chemicals and dyes which were badly needed since there was no American dyestuff industry at the time.

He was the first to manufacture the dry color, called Red for Lake C, which was the principal red color for printing inks. His firm is said to have been largest U S maker of this color until sale to the Calco Chemical Company in 1929. Dr May joined Calco and served as an executive for eighteen months until 1931 when he resigned, repurchased his factories at Niagara St, Newark, and organized Otto B May, Inc to manufacture vat dyes. His son, Ernest M May, joined the firm in 1938 and will continue its management.

Dr May was born in 1880 in Worms, Germany. He received his PhD in pharmacology at the University of Strassbourg in 1904, after which he came to this country in 1907. He served two years as instructor in chemistry at Columbia University and assisted Professor Coblentz in his revision of the United States *Pharmacopeia.* He married the former Eugenio Morgenstern in 1911 and came to Newark with the Johann Hoff concern at that time.

He leaves his wife Eugenie May, two children, Ernest M May and Mrs Helen M Strauss, eight grandchildren and a brother Cornelius May.

Wingspan of largest silk-producing moth in world is measured by Nelson S Knaggs

A newly-hatched silk-producing moth flutters after emerging from cocoon

• Display of Silk-Producing Moths Arouses Widespread Interest

A unique display of live, silk-producing moths served to attract considerable interest as one of the features of the Hilton-Davis Chemical Company's exhibit during the AATCC Convention in Boston this month.

The man responsible for originating the idea, and who directed every phase of its execution, was Nelson S Knaggs, vice-president in charge of sales for Hilton-Davis, the Cincinnati firm which pioneered the development of flushed colors.

A member of the board of trustees of the Cincinnati Museum of Natural History, as well as a famed explorer, Mr Knaggs came up with the idea about six months ago that "a bit of natural history would be a dramatic way to call attention to the use of Hilton-Davis dyestuffs with cotton, wool, silk and synthetic fibers". Live cotton plants growing in the exhibit would dramatize the cotton fiber, he figured. For the silk display, Mr Knaggs dreamed up the most ambitious undertaking: a live demonstration of various stages in the life cycle of the silk-producing moth, to be climaxed by the hatching of moths from the cocoon stage during the AATCC convention at Boston's Hotel Statler.

The latter project posed the monumental task of finding the eggs of silk-producing moths and staggering their growth so that they would be in different stages of development at the convention. Accordingly, Mr Knaggs asked the advice of Professor Carroll Williams of Harvard University, a renowned entomologist, and was offered the assistance of two of the professor's proteges, freshman students Charles Walcott and Ben Dane.

They already had some silkworm species at Harvard. In addition, they arranged to have other species flown to Harvard from various parts of the world. In this latter group was included the rare Indian moth Mylitta, whose wingspread at full growth measures one foot, largest in the world. (The Mylitta caterpillar, which actually spun silk at the AATCC exposition, turned out to be one of the most dramatic features of the Hilton-Davis exhibit.) With respect to staggering the development of the moths' life cycles, refrigeration was decided upon as the most effective means.

Meanwhile, Mr Knaggs bought a large number of Japanese silkworm eggs, settled them down in his home in Cincinnati and attempted to nurse their development slowly. While at the Hilton-Davis plant during the day, he kept the eggs in the Knaggs refrigerator. At night, he kept them beside his bed and fed them mulberry leaves, their exclusive diet. The question then arose as to how to obtain mulberry leaves in Boston in November. This thorny problem was solved by freezing the leaves. An equally novel discovery, that the caterpillars thrived on a supplementary diet of vitamins, was also made.

Eight-inch-long caterpillar of the Mylitta species imported from India's Khasi Hills

Mr Knaggs' bedroom became a cluttered place, for in addition to the silkworm eggs there were a dozen young potted cotton plants being cultivated. In a final bit of inspiration shortly before the AATCC show, he removed the boles from the cotton plants and dyed the cotton fluffs with various Hilton-Davis naphthols and fast bases. The plants themselves had been sent to the Arnold Arboretum at Harvard University for further care.

To house the live displays, Knaggs conceived an exhibit built around a revolving three-sided pylon. Each side of the motor-driven unit consisted of three panels illustrating the use of Hilton-Davis dyes with a particular fiber, and highlighted the "natural history" of the fiber. Topping off the display of the live silkworms was a mounted collection of huge, brilliantly-colored silk-producing moths gathered from all parts of the world, borrowed from the Cincinnati Museum of Natural History.

The "livestock" were quartered in Knaggs' room at the Statler, the night before the convention opening, in cartons that almost filled the room. After bedding them down for the night, which included providing some giant-sized caterpillars from India with supplies of oak leaves, Mr Knaggs went to sleep. He was awakened during the night by loud noises and wings

fluttering, to find that almost a dozen moths had hatched from cocoons and were flying around the room. In addition, the 8-inch caterpillars had gone through the supply of oak leaves, crawled out of the cartons and were foraging for food over the furniture and bed.

"At that point, I began to think that none of the remaining cocoons would hatch during the show", Mr Knaggs reminisced, "but they did. On opening day, about six hatched. And another dozen were born before the convention ended. Some developed so quickly that they flew out of the exhibit and kept soaring around the displays. They were wonderful advertising mediums. We should have put Hilton-Davis posters on them."

During all the advance preparations, Mr Knaggs also had to contend with the possibility that something would go wrong, thereby leaving him without an exhibit. To forestall this eventuality, it was necessary to have in readiness standby displays. These consisted of the entire life cycle of the Japanese silk-producing moth Bombyx Mori, in a preserved state; and a complete set of cotton plants growing in Cincinnati, to be flown to Boston in the event the original plants died.

"The large crowds at the Hilton-Davis booth certainly indicated wide interest in natural history", Mr Knaggs noted. "It must have been absorbing because people brought their children to see our exhibit on Saturday, the closing day. I believe we passed out to the kids all the Japanese silkworms cocoons we had, each containing one-half mile of silk".

• Freshman Enrollment Sets All Time High at NBTI

New Bedford Textile Institute reports a new high in the number of freshmen enrolled for the several curricula offered. Textile Chemistry is again the most popular course among the freshmen, but a marked increase in the enrollment of young women in Textile Design and Fashion is also evident in contributing to the total of 86 new students at the Institute.

The inroads of the Selective Service on the upper classmen is reflected in a slight drop in the total Fall Term enrollment to 228. Of this total, 41 are veterans. As usual, Massachusetts residents comprise the major portion, making up 85% of the present student body. Foreign students constitute 6% of the total with Israeli nationals being most numerous.

The number of women enrolled is at a record high, comprising 13% of the student body.

C De Soto

• Cyanamid de Mexico to Distribute Finishes

Reactivos S A, a Mexican firm which has distributed American Cyanamid Company's mining chemicals since 1926, has expanded its activities to include the entire range of Cyanamid's agricultural chemicals and textile finishes. With this expansion, the name of the Mexican firm was changed to Cyanamid de Mexico.

Martin Fitzsimmons will be general manager of Cyanamid de Mexico, succeeding Arthur Stockdale, retired president and director of Reactivos S A. Mr Stockdale will remain active in the firm as a consultant to its management.

Cecilio De Soto will be in charge of Cyanamid de Mexico's sales of a complete line of textile finishes, chemicals and resins, including some 25 different products. A native of Cuba and an alumnus of Lowell Textile Institute, Mr DeSoto has been with Cyanamid since 1945. He began with the firm as a member of the Textile Resin Department of its Calco Chemical Division at Bound Brook, New Jersey. Since 1948 he has been travelling throughout the Western Hemisphere offering technical service to the textile industry.

Citing Mexico's modern rayon industry which was established following World War II and a growing quality consciousness on the part of textile buyers in Mexico, Mr De Soto has predicted that in the near future textile resins will be as widely accepted in Mexico as they are today in the United States.

Cyanamid de Mexico will occupy the former offices of Reactivos S A at Edificio El Provenir, Aquiles Serdan 28, Mexico, D F.

• 15-20 $2000 NETF Scholarships Available to High School Grads

Applications from high school graduates are now being accepted by the New England Textile Foundation for four-year scholarships worth $2000 each. From $30,000 to $40,000 will be shared among 15 to 20 high school graduates wishing to take textile courses at any of four New England textile colleges, matriculating in September, 1953.

Any American high school graduate is eligible to apply for a New England Textile Foundation scholarship. Awards are made on the basis of the applicant's high school record, and his rank in the standard aptitude test given by the College Entrance Examination Board in various centers throughout the United States in March, 1953.

The NETF Scholarship Awards, which have been distributed annually in similar amounts since 1946, are underwritten by contributions from companies in the textile and related industries. Objective is to recruit for the American textile trade a constant supply of college-trained and technically educated young men and women.

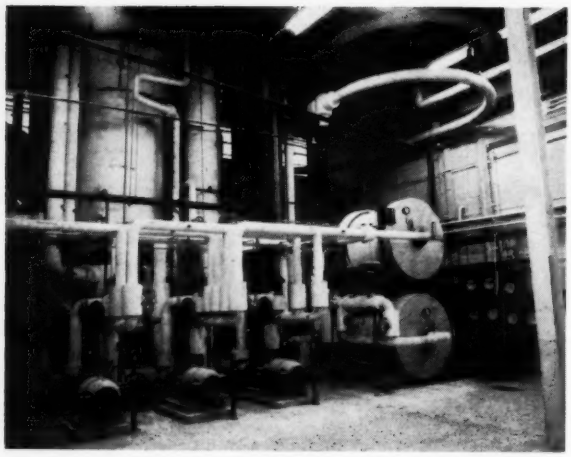
Scholarship winners have free choice among the four New England textile colleges participating. Included are Bradford Durfee Technical Institute, Fall River, Mass; Lowell Textile Institute, Lowell, Mass; New Bedford Textile Institute, New Bedford, Mass; and the Textile School of Rhode Island School of Design, Providence, R I. Any course of study relating to textiles may be elected, with the exception of clothing design.

As long as satisfactory grades are maintained in college work, students being educated under NETF scholarships receive their $2000 awards in eight installments at the rate of $250 per semester. On graduation, no restrictions are imposed as to where the students may seek employment, or what type of employment they may accept.

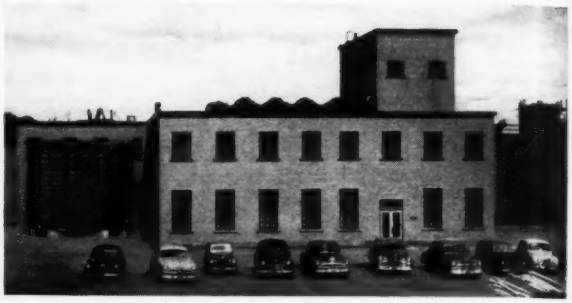
Although present holders of Foundation scholarships are preponderantly New Englanders, the contingent from New York and New Jersey is numerically strong, and both the Mid-West and Central Atlantic areas are well represented.

High school students intending to compete for N E Textile Foundation Scholarships in 1953 may obtain application blanks and full information from George T Metcalf, the Foundation's executive secretary, care of New England Textile Foundation, 68 South Main Street, Providence 3, R I. Candidates are urged to complete the preliminaries of application as early as possible. Final deadline for submission of applications is January 15, 1953.

As in each successive year since its inauguration, the NETF Scholarship Contest for 1953 is approved by the National Association of Secondary School Principals.



The heart of the Lignosol plant is this room containing the evaporator in the background, the panel board and the heat exchangers (right foreground), the feed and distillate pumps, at left. Total height: approximately 40 feet.



General view of the Lignosol plant, in Quebec City.

• Quebec Plant Producing Lignosols

The official opening of the $1¼-million plant of Lignosol Chemicals Limited by Quebec's Prime Minister Maurice L Duplessis, last June in Quebec, P Q, climaxed a decade of patient research and steady development which brought about the invention, the production and the sale of new products useful to industry.

Lignosol derives from spent sulfite liquor, a by-product of chemical wood pulp, and comes in liquid and powder forms. In addition to its use as a dye leveling agent, it is used in road building as a soil stabilizer, in the manufacture of leather; as a cement dispersant, an adhesive for gummed tapes, a ceramic plasticizer, a foundry core binder, a refractory binder, and as an additive in electrolytic copper refining.

Lignosol Chemicals Limited was incorporated over two years ago with a reported capitalization of $5,000,000 supplied jointly by the Anglo Newfoundland Development Company, Grand Falls, Newfoundland, and the Anglo Canadian Pulp and Paper Mills Limited, Quebec City.

The productivity capacity of its plant is said to be 22,500 tons per annum, of which some 40 per cent is exported to the United States. Close to 100% of the plant's raw materials come from the province of Quebec. Sales for 1951, the first production year, reportedly totalled $230,000, while they are estimated at $400,000 for this year, and at $750,000 for 1953.

F T Atkinson is President and General Manager of Lignosol; Chairman of the Board is E M Little, President and General Manager of Anglo Canadian Pulp and Paper Mills Limited.

• L & N District Sales Office Moved

The Philadelphia district sales office of Leeds & Northrup Company, manufacturer of electrical measuring instruments, automatic controls, and heat-treating furnaces, was moved early this fall from 4901 Stenton Avenue to new and larger quarters at 444 North 16th Street.

The greater space provided in the new offices is said to afford better facilities for supplying engineering information and service in Pennsylvania west to Altoona and the coastal states from New Jersey through North Carolina.

The company's advertising department and training school will occupy the remaining space at the new 5-story building address. A large adjoining warehouse is also being occupied by the firm. Areas vacated in the main plant on Stenton Avenue will be available to meet increasing demands of manufacturing departments.

• Jamaica Textile Mill Among World's Most Modern

Although Jamaica is known as one of the premier year-round tourist resorts, it may be news that the island is proceeding with an extensive program of industrial development in areas remote from tourist regions. It is already operating a cotton mill, said to be among the most modern in the world.

The building of the Ariguanabo Company of Jamaica Limited stands on 4½ acres of ground and is completely air conditioned. The operations include the full processes of spinning, weaving, bleaching, dyeing, and finishing.

One of the features of the building is the construction of reinforced foundation columns, beams, and the roof slab, with fillings of bricks which were made on the mill site in individual moulds. Two million of these bricks were used, it is reported. Their porosity has proven excellent and at the same time has assisted in creating the correct conditions for the air conditioning.

The machinery is entirely new, the bleaching, dyeing, and finishing type coming primarily from H W Butterworth & Sons Company.

The mill is said to be geared to produce, at 100% efficiency, working 300 days per year, three 8-hour shifts daily, a total of 14 million yards. The company has a fully paid-up capital of £900,000, or $2,520,000, it is reported.

• National Textile Fraternity Honors Business Leaders

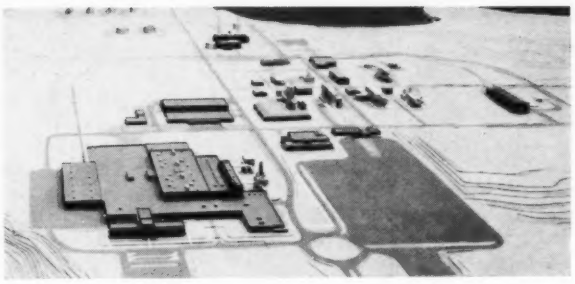
Three prominent business leaders were inducted into the Delta Kappa Phi Fraternity of America, Inc, reputedly the oldest textile fraternity in America, at a dinner meeting at the Alden Park Dining Room on October 22.

Officers of the Alpha Chapter conducted initiation ceremonies for the following: Dr Frederick H Barth, president of the Industrial Rubber Company, president of the College of Osteopathy and a member of the Board of Governors of the Philadelphia Textile Institute; Harmon B Riehl, vice president of the Textile Division of Proctor and Schwartz, Inc; John H Senior, vice president in charge of sales of the Textile Division of Proctor and Schwartz, Inc.

Speaker of the evening was Prof Robert Bokum of Philadelphia Textile Institute on the subject "The Southward Migration of the Textile Industry".

• Cotton Research Clinic to be Held in Savannah

February 18, 19 and 20 have been set as the dates for the National Cotton Council's fourth annual Cotton Research Clinic at the General Oglethorpe Hotel, Savannah, Ga.



Scale model of The Chemstrand Corporation nylon filament yarn plant shows the plant office building and textile spinning area (lower left) and the chemical area (upper right) where raw materials will be produced.

• Chemstrand Nylon Plant Construction on Schedule

The construction of the nation's first integrated nylon plant on a 120-acre area in the center of the Chemstrand Corporation's 2000-acre tract along the Escambia River (12 miles north of Pensacola, Fla) is advancing on a time-table schedule according to Roy G Hemminghaus, plant manager. Preliminary survey work and ground clearing, plus installation of warehouse facilities, got underway in August, 1951. It is expected that the new plant will employ upwards of 3000 when completed.

The plant comprises two basic areas, the chemical area where the intermediates are produced and the textile area where the fiber will be spun, plus numerous other structures necessary for a project of this scope. Nearly 30 separate structures plus storage tanks comprise the entire project. All are reportedly of the most modern concepts of design and construction.

The chemical area provides facilities to produce nylon salts required by the textile area for spinning nylon filament yarn. Heretofore, nylon salts have been produced at separate locations and shipped to spinning plants located elsewhere in the country.

The spinning building dominates the textile area, a structure measuring 600 by 750 feet. This area is expected to be kept on a 24-hour work-day basis, and will employ an estimated 2300 workers on three shifts.

Immediately in front of the spinning building is the plant office building where some 150 persons will be employed.

The chemical area will occupy a plot 800x1000 feet and will consist of facilities to produce the salts.

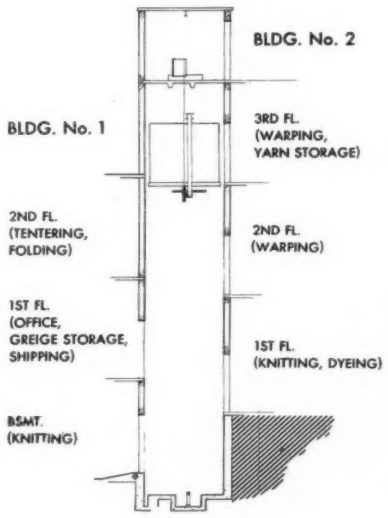
Other facilities will include laboratories, warehouse facilities, maintenance shops, power plant, tank storage facilities and parking areas—the main one of which will accommodate 800 cars, it is reported.

The area is said to be served well by highway, rail and water transportation. Some of the raw materials will be received from the Texas Gulf Coast via the Inter-Costal canal and Escambia River, and others by rail and truck. Outgoing shipments will utilize rail and highway transport primarily.

• One Freight Elevator Serves Two Buildings in Gloversville Plant

A light-duty freight elevator designed to solve the problem of adapting existing buildings to changes in manufacturing processes is being put into operation this month in the plant of the 50-year-old Fulton County Silk Mills, Gloversville, N Y. Materials handling at this plant is further complicated by the fact that, although the two main buildings are adjoining, the floors are at different levels.

Until recently weight was a minor consideration in materials handling at this plant. Small hand-hoists took care of the vertical transportation. Nylon, rayon and "Orlon" acrylic fiber yarns, all considerably heavier than silk have largely replaced it. Bobbins are larger. No longer can the old hand-hoist keep up with production. Bottlenecks have appeared. With heavier raw materials, the difference in floor levels between the two principal buildings has become a more acute problem.



The elevator is being installed by the Otis Elevator Company in the taller of the two adjoining buildings shown in the illustration. The car will be equipped with doors at both ends so that the elevator can serve all floors in both buildings. Although each building has three stories, the elevator will make five stops in a total rise 34'-7".

Bi-parting counter-balanced doors will permit fast opening and mechanical interlocks and electrical contacts will insure safe operation. The car will have a capacity of 2500 lbs at a speed of 25 feet per minute. The car platform, 6 ft wide by 8 ft six inches deep, will permit fast loading and unloading with wheeled-trucks and manual jack-lift hand trucks.

Based on estimates which led to the purchase of the elevator, officials of the company expect to cut materials handling costs to 18% of costs without the elevator, or a saving of 82%. Executives at Gloversville chiefly concerned with this unique solution are Stanley W Taylor, *Secretary;* Fred Smith, *Superintendent;* and George W Taylor, *Chief Engineer.*

• G E Demonstrates Washability of New Synthetics

A nationwide series of demonstrations on the washability of new synthetic fabrics has been undertaken by the General Electric Company.

Mrs Natalie Barry, supervisor of the home laundry division of the General Electric Consumers Institute, describes the presentation as a combined fashion show and instruction session. Practical methods for the home washing-machine laundering of the new fabrics are exhibited. Titled "The Fashion Fantasy," the show is being produced in collaboration with leading department stores all over the United States.

In its present format, the "Fashion Fantasy" starts with an explanation of dynel, Orlon, Dacron, nylon, and such combinations of these with wool and cotton as Lorette and Visa. Actual machine-washing, drying, and tinting is done during the program, which also includes a store showing of women's clothing in a variety of materials.

Virtually every department of the store participates in "The Fashion Fantasy" with related items such as jewelry, millinery, and shoes.

• AIL Convention

Five top New York textile experts headlined the speakers program at the 65th Annual Convention of the American Institute of Laundering, held October 2-5 at Atlantic City, N J.

Appearing on a laundry-dry cleaning-textile-retail panel, which discussed how these "Industries Can Better Serve the Public", were the following: William Burton, manager, Merchandising Division, National Retail Dry Goods Assn; Charles W Dorn, Chairman of the Research Committee, AATCC; Albert E Johnson, director, trade relations, National Institute of Cleaning and Dyeing; and Leonard S Little, Chairman, Executive Committee on Research, AATCC.

Herbert H Hyman, advertising and promotion manager for Consolidated Laundries, Inc, delivered a talk entitled "Let's Get Excited", in which he urged commercial launderers to launch an all-out drive for increased sales.

Some 6000 laundryowner delegates attended the four-day session, which featured a model laundry exhibit large enough to serve a city of 500,000.

• Syllabus, Quebec Section, CATCC

Technical meetings of the Quebec Section, Canadian Association of Textile Colourists and Chemists for the remainder of the 1952-3 session will be held as follows:

Dec 13 —— "Multifiber Processing and Dyeing on the European and North American Plan", R W Jacoby, Ciba Company, Inc

Jan 17——"Chemicals and the Textile Industry", a panel headed by C Fitton and E I Birnbaum

Feb 21——"The Preparation Dyeing and Finishing of Hosiery and Knit Goods", J V Boone, Geigy Co, Inc

Mar 21 —— "Advances in Acetate Processing and Finishing"——H P Baumann, American Aniline Products, Inc

All will be held in the Lecture Theatre in the new Physical Science Centre of McGill University, Montreal, Quebec. Buffet suppers will be held in the Mount Royal Hotel after each meeting.

The Annual Meeting on April 17th, followed by the Annual Dinner on the 18th, will be held at the Mount Royal.

The annual Golf Tournament is slated for June 20th.

• Mathematical Computing Service

With the increasing importance of mathematical methods in the field of textile technology, a group of consultants devoted exclusively to applied mathematics has been organized under the name Mathematical Computing Service with headquarters at 105 Court St, Brooklyn 2, N Y.

Mathematical Computing Service specializes in performing services for industries and universities desiring engineering calculations, charts and nomographs of a high degree of complexity and the treatment of related mathematical problems in the field of textile technology. An important function of the group is the mathematical formulation and complete solution of a problem from given physical data. The staff consists of consultants holding Doctorate degrees who are qualified to treat problems in applied mathematics related to the physical sciences.

• Date for '53 AATT Symposium Set

The American Association of Textile Technologists has chosen Feb 3, 1953, for its second annual one-day symposium at the Hotel Statler in New York.

For the first time at this event, exhibits of fiber and laboratory equipment producers will be held in conjunction with the meeting in the rotunda and parlors outside the main ballroom of the hotel.

The committee planning the event is headed by Leonard S Little, consultant.

Larus R Burgess of Cone Mills will head the Exhibit Committee, while Campbell-Fairbanks Associates will handle exhibit management.

NAMES IN THE NEWS

DAN M RUGG, vice president of Koppers Co, Inc, Pittsburgh, Pa, has been appointed vice chairman of the Plastics Committee of the Manufacturing Chemists' Association, Inc and HARRY M DENT, president of Durez Plastics & Chemicals, Inc, North Tonawanda, N Y, has been made a member of the committee. Mr Dent's appointment fills the vacancy created by the death of F A ABBIATI of Monsanto Chemical Co.

Both Mr Rugg and Mr Dent have had long careers in the chemical and plastics industries and are former directors of the Plastics Materials Manufacturers Association, which was consolidated with the Manufacturing Chemists' Association, Inc in 1950. Mr Dent was instrumental in organizing the Durez company in 1921.

Other members of the MCA Plastics Committee are M G Milliken, chairman, Hercules Powder Co; Howard A Bunn, Bakelite Co; John P Coe, United States Rubber Co; Donald S Frederick, Rohm & Haas Co; and Roger S Firestone, Firestone Plastics Co.

IT WAS announced on October 31st by A von Gontard, Vice President, and Arthur E Weber, General Sales Manager

T M Robertson, Jr

of the Yeast, Malt & Corn Products Division of Anheuser-Busch, Inc, that TATE M ROBERTSON, JR had been appointed sales manager of the Corn Products Department.

A SERIES of personnel changes in the Industrial Chemicals Department of the Atlas Powder Company have been announced by George J King, director of sales, and K E Mulford, general manager.

DIXON VAN WINKLE has been appointed special sales assistant in the sales division, where he will report directly to Mr King. Mr Van Winkle, who was formerly eastern general manager for Julius Hyman Company, will correlate sales efforts in specific field of sorbitol usage.

ARTHUR F QUINLAN has been assigned as technical sales representative to service customers in northern and western New York.

MAURICE A PONTI has also been made technical sales representative. He is assigned to the New York sales office and will cover parts of northern New Jersey.

THE appointment of DR J KEITH LAWSON, JR, as a group leader and the naming of four other chemists (DR WILLIAM K EASLEY, RALPH O FLEMING, EUGENE RINGWALD and POMPELIO A UCCI) to new duties in the Research and Development Department of The Chemstrand Corporation was announced by Dr Frank J Soday, director, on October 16th.

All were previously engaged in fiber research and development at Dayton and Marcus Hook.